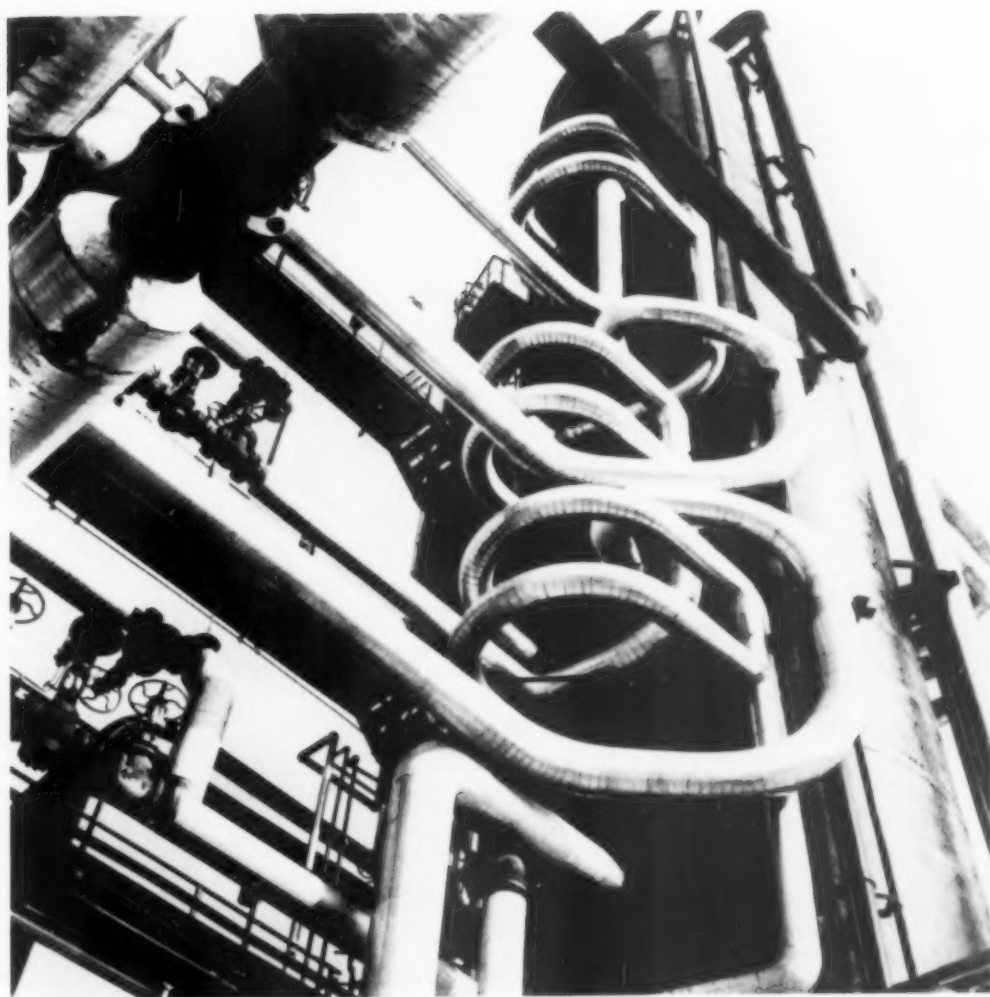


Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

**APRIL
1960**



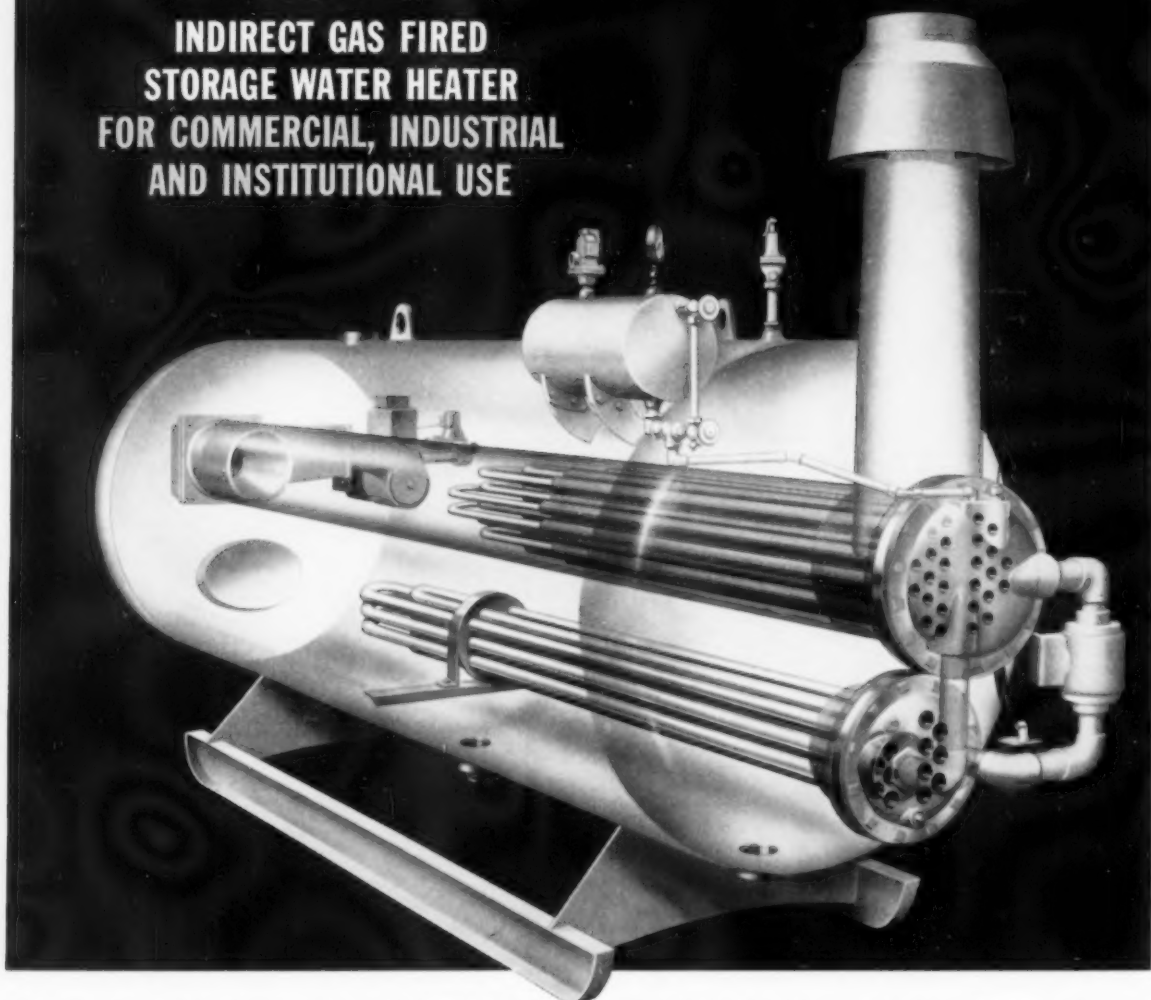
INSULATION for Lake Charles Refinery SEE DESCRIPTION P. 26



Plant Services for Bowaters P. 28

FIRST

INDIRECT GAS FIRED STORAGE WATER HEATER FOR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL USE



*No scaling • No drop-off in rated efficiency
• No fuel waste • No on-the-job assembly • No
complicated maintenance • No limitations
on placement • Fully automatic • Copper
heating surface*

P-K SCALEFREE 230* is a unique rugged unit backed by P-K's 80 years of experience in building and designing quality water heating equipment. It heats water through hot intermediate distilled water. Transfer occurs below the temperature at which minerals that cause scaling precipitate. Efficiency remains unimpaired throughout service life. Linings of pre-Krete or copper are available

*Patent pending

to keep the unit free of rust and corrosion regardless of water conditions.

SCALEFREE 230 features a new P-K gas burner. It operates at maximum practical efficiency. Yet it gives almost noiseless service—does not rumble or boom on startup. This permits location almost anywhere in office buildings, institutions, schools, motels, etc.

SCALEFREE 230 is a complete fully automatic package that can be quickly set in place, hooked up and checked out. It is available in more than 100 storage and recovery combinations. Storage capacities range from 250 to 4000 gallons. Recovery sections range from 390,000 to 2,215,000 Btu. Write for catalog with full information.

Patterson  **Kelley**
107 Morgan Ave., East Stroudsburg, Pa.

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Volume 78

Number 4

CLARAGE



"Packaged" fans . . . ready-to-run units for supply and exhaust jobs ranging to 25,000 CFM. Adjustable in-the-field to 8 discharge directions. Available for both outdoor and indoor installations. Send for 36-page catalog containing complete information or contact nearest Clorage sales engineering office.

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Please send your Ready Unit Catalog 517.

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COMPANY _____

ADDRESS _____

CITY _____

STATE _____

Dependable equipment for making air your servant

CLARAGE FAN COMPANY

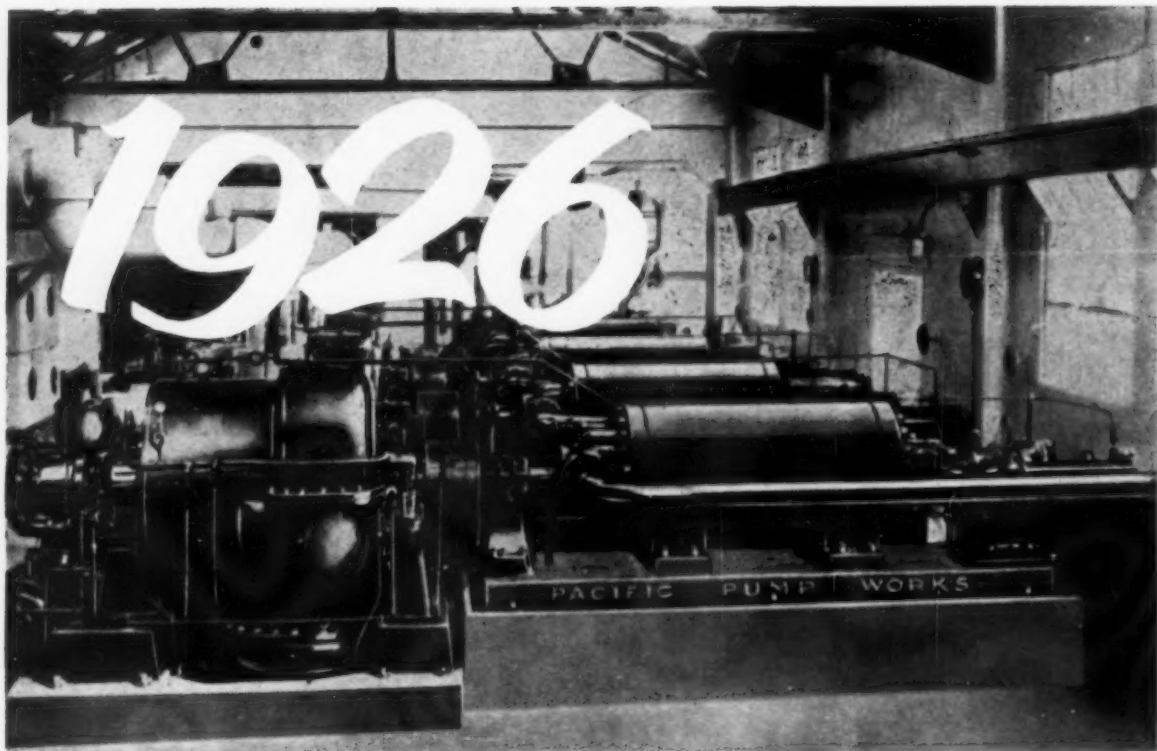
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SOUTHERN POWER & INDUSTRY for APRIL, 1960

For more information, use Reply Card—Page 73

1



PACIFIC PUMPS *first "FIRST"*

The centrifugal pumps designed and built for Pan American Oil Company's new high-pressure cracking process in 1926 was one of the most significant engineering achievements of the Twenties in the refinery processing field. The first of many Pacific Pumps' "FIRSTS", this particular pump was the forerunner of today's greatly improved Pacific centrifugal process pump line. Over the years Pacific has built and installed thousands of vertical and horizontal centrifugal pumps for extreme pressures and temperatures demanded by the petroleum, chemical, petro-chemical and allied industries. In addition, Pacific designs and manufactures boiler feed pumps for the power industry, steam turbo-pumps for the marine and power generation fields, and plunger pumps for oil-well service.

This first Pacific advertisement appeared in several petroleum publications early in 1927



Offices in all Principal Cities

Write for
Bulletin 1C

2000 POUNDS PRESSURE WITH CENTRIFUGAL PUMPS



View of recent installation of four "PACIFIC" Multi-stage Pumps at Pan American Petroleum Company Refinery, Los Angeles. Each Pump delivers a capacity of 400 Gallons Per Minute of Oil against a pressure of 2000 pounds. Pumps are driven by 750 H. P. Steam Turbines. Each Pump weighs nine tons and was required to pass a hydrostatic test of 5000 pounds pressure.

We are prepared to make prompt shipment of Booster Pumps for Pipe Line or High Pressure service. Special Pumps designed for unusual conditions.

PACIFIC PUMP WORKS

150 Bicket Street Huntington Park Los Angeles, Cal.

PACIFIC PUMPS

Inc. . . A Division of Dresser Industries, Inc.

HUNTINGTON PARK, CALIFORNIA

SOUTHERN POWER & INDUSTRY for APRIL, 1960



Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

Eugene W. O'Brien
Managing Director

Vol. 78
No. 4

APRIL, 1960

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SOUTHERN POWER & INDUSTRY for APRIL, 1960



Facts and Trends

April 1, 1960

- ◆ **CYCLICAL BUYING** - Electric utility companies can save more than a half-billion dollars in the next ten years if they change their present cyclical buying habits, according to a statement by William S. Ginn, Vice-President of General Electric Company. Production costs tend to run over ten per cent higher under cyclical conditions than they would under more stable conditions.

He pointed out that the utility industry, as a whole, adds generating capacity in a cyclical pattern that runs about five years between peaks. For example, in 1954 utilities added 10.5 million kilowatts. This figure plummeted to a trough in 1956 of 4.8 million kilowatts, and skyrocketed back up 160 per cent to a 1958 peak of 12.5 million kilowatts.

- ◆ **SHOTGUN RECRUITING** - The shortage of competent engineers is painfully apparent when viewed in the light of recruiting techniques recently adopted by certain companies. The Industrial Relations News reports that many happily employed engineers are receiving phone calls, letters, and even recorded announcements exhorting them to change jobs. Some even get mail and phone calls in their offices and labs.

The implications of such practices are many and of doubtful benefit to all concerned, the report adds. Many engineers feel the "shotgun" approach is damaging both to the profession and the companies using it. Most companies agree, saying that direct mail recruiting lowers employment standards and increases job turnover.

- ◆ **MACHINED FIREBRICK** - The Babcock & Wilcox Company reports that it is reducing machining charges on six brands of lightweight insulating firebrick by as much as 48 per cent.

Reduced charges will apply to standard shapes machined from six brick series commonly used in furnace constructions in the steelmaking, metalworking, ceramics and chemical processing fields. The shapes include arches, wedges, keys, necks, and feather edges.

- ◆ **STRONGER ALLOY SHEETS** - Aluminum Company of America has announced a new tempering process that increases both strength and reliability of the strongest of the increasingly popular aluminum-magnesium alloys.

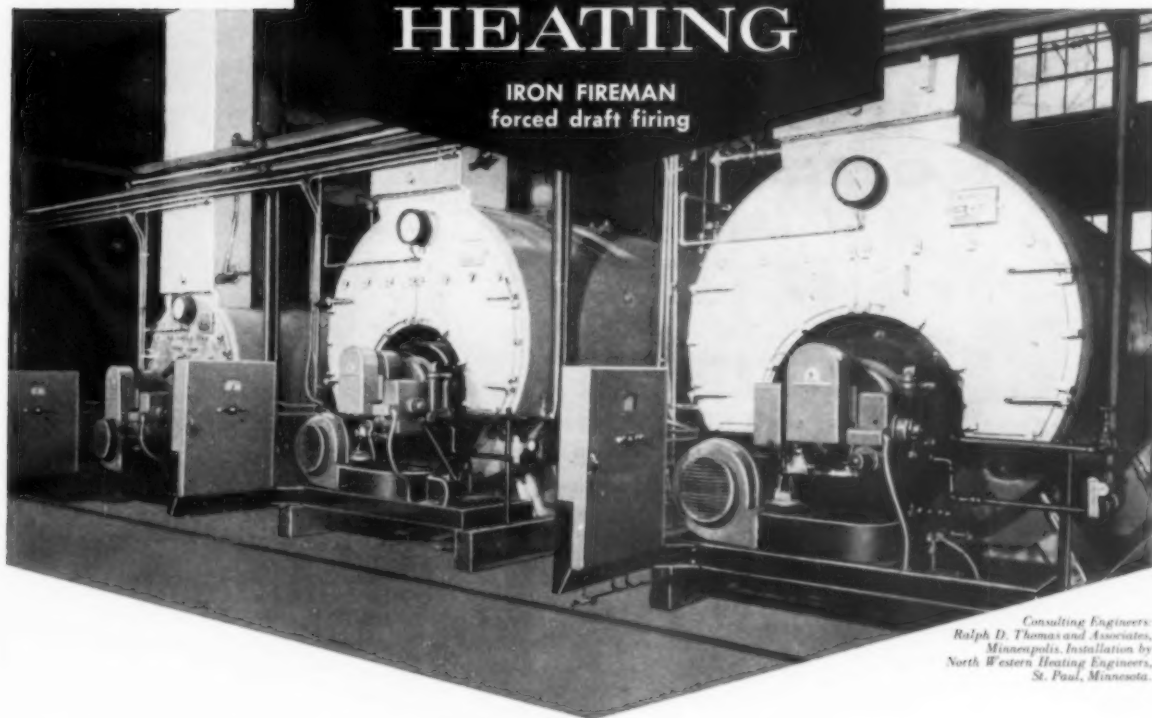
The process makes possible two new tempers, designated -H323 and -H343. Both assure maximum resistance to stress corrosion for sheet in alloys 5456 and 4083. Sheet in these alloys - introduced during the past year - is used widely in highly stressed products.

- ◆ **FIN POWER** - Two of the top five largemouth bass entered in the Southern Division of Field & Stream magazine's 1959 national fishing contest were caught in Georgia Power Company lakes. First-place fisherman in the Southern Division, which comprises all Southern states but Florida, was Fred A. Worley, who caught a 15-pound 7-ounce lunger at Lake Rabun near Clayton, Georgia. Jim McCrackin placed fifth by landing a 12-pound 5-ounce bass at

(Continued on Page 8)

The new world of HEATING

IRON FIREMAN
forced draft firing



Consulting Engineers:
Ralph D. Thomas and Associates,
Minneapolis. Installation by
North Western Heating Engineers,
St. Paul, Minnesota.

This new heating plant increased boiler capacity 70%, yet will return the investment in 7 years

The Minnesota Masonic Home in Minneapolis faced a problem that is familiar to many owners of old heating plants—should the old plant be modernized or replaced?

After a thorough study of several alternatives, the engineering firm of Ralph D. Thomas and Associates recommended a complete replacement. The three Iron Fireman-Kewanee boiler-burner units shown above provide extra capacity for future needs, while cutting steam costs so sharply that engineers estimated they will pay for themselves in seven years.

COMPLETE, PACKAGED FIRING SYSTEM

The first big saving was in installation—the three units were moved in intact. No boiler settings, no brickwork,

no special wiring required. The factory assembled units included boilers, burners, forced draft air supply, wired and tested control panels and fuel systems, all mounted on a permanent base. Low operating costs were the result of high combustion efficiencies (reduced fuel bills) and low maintenance. With packaged installation, factory responsibility covers practically the entire job.

FOR OIL, GAS OR DUAL-FUEL FIRING

Oil models fire any grade of oil from No. 2 to No. 6. Gas models take any type of high or low pressure gas. With dual-fuel models, fuels can be switched at a moment's notice with either manual or automatic controls.

Mail coupon for full information.



IRON FIREMAN

HEATING AND AIR CONDITIONING
AIRCRAFT COMPONENTS AND EQUIPMENT
MISSILE AND AIRCRAFT GYROSCOPES
ELECTRONIC EQUIPMENT
CONTROL INSTRUMENTS

IRON FIREMAN MFG. CO., 3060 W. 106th St., Cleveland 11, Ohio
(In Canada, 80 Ward St., Toronto)

Please send complete technical description and specifications on Iron Fireman forced draft firing.

Name
Firm
Address
City State or Prov.

THE **MODERN** TREND IS TO COAL

WITH DETROIT STOKERS* FOR ECONOMY OVER THE YEARS!

Increasing numbers of forward looking engineers recognize that coal is the most economical fuel over the long term, and that it can be burned most efficiently with Detroit Stokers.

Stability of price and lower cost in most industrial areas have made coal the most favored fuel in new plants being built today.

Detroit Stokers keep pace with this trend through continuous new developments and improvements that provide greater efficiency, easier operation and more economy.

Detroit Stokers are built for years of dependable service. Savings in fuel cost and maintenance continue to pile up long after the initial investment has been repaid.

This has been proved in hundreds of prominent Utility, Industrial and Institutional plants.

YOU can enjoy the benefits of modern, economical coal firing—Let us show you the Detroit Stokers best suited to your operating conditions.

Detroit RotoGrate Stokers for boilers up to 400,000 pounds steam per hour capacity. A spreader stoker with forward moving grates which continuously discharge ash at the front.



BETWEEN THE LOSTOKER AND ROTOGRADE STOKER IS A COMPLETE LINE OF UNDERFEED AND OVERTHROW SPREADER STOKERS FOR EVERY NEED.

Detroit LoStoker—capacity range 3,000 to 12,000 pounds steam per hour. An underfeed stoker of high efficiency—available with "start and stop" or "full floating control."

Detroit Stokers cost less: cost equals initial investment plus upkeep plus production losses due to equipment outage. The total is less with Detroit.

DETROIT STOKER COMPANY

Main Office and Works, Monroe, Michigan • District Offices or Representatives in Principal Cities



make it

SPANG STEEL PIPE

When it's steel pipe . . .

. . . you're buying pipe with inherent strength and safety. Steel pipe is easy to thread, bend and weld . . . saves you installation time, helps keep construction costs down.

And when you install a steel pipe job, you *know* from experience that it will provide years of satisfactory, trouble-free service. Reliable steel pipe is first choice always for plumbing, air conditioning, steam and radiant heating systems, snow melting, refrigeration, ice rinks and structural uses.

When it's SPANG Steel Pipe . . .

. . . you're buying steel pipe with the *top-quality* reputation. Spang pipe is closely controlled during manufacturing and is thoroughly tested and inspected before shipping.

And when you order Spang, you *know* you're getting top-quality, the best available! Today, you'll find Spang Steel Pipe providing *top-quality* service in thousands of installations in schools, hospitals, industrial plants, office buildings, hotels, apartments, homes and many other types of buildings.

Get the complete story . . .

. . . of Spang Steel Pipe from our new Bulletin No. 509. It describes how Spang is made, shows many typical Spang installations, and contains valuable technical tables. We hope you'll write for a copy.

Meanwhile, your local Spang Distributor is at your service for all your piping needs. Next job, remember for best results: make it Steel Pipe . . . make it Spang! Made in the U.S.A.!



THE NATIONAL SUPPLY COMPANY

Two Gateway Center, Pittsburgh 22, Pennsylvania

Subsidiary of Armco Steel Corporation



Facts and Trends (Continued)

Lake Tugalo near Toccoa. Mr. Worley's prize-winning catch was 4 pounds 7 ounces heavier than the winning entry in the Northern Division. The world-record largemouth - 22 pounds 4 ounces - was caught in Georgia in 1932.

- ◆ **SAFETY CODE** - The newly revised American Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1-1959, is available. The purpose of the 46-page standard is to provide reasonable and adequate means, ways, and methods for the proper selection and safe use of head, face, neck, eye, and respiratory protective equipment.

Changes made since the previous 1938 edition include the addition of plastic eye protectors, and an increase in strength requirements for eye protection. The code has been brought up to date with modern production methods working environments and available safety equipment. Price - \$3.00 a copy, from the American Standards Association, Dept. PR121, 70 East 45th Street, New York 17, N. Y.

- ◆ **CERAMIC FIBER** - Alumina-silica fibers are a new class of high temperature insulating materials that are light in weight yet physically strong.

With their low thermal conductivity, these fibers will withstand continuous use at temperatures up to 2300 F and can be used at even higher temperatures for shorter periods of time. "Fiberfrax" is manufactured by The Carborundum Company, and a descriptive bulletin is available.

- ◆ **CORE GOES CRITICAL** - The nuclear power core which will some day drive the N. S. "Savannah," the world's first atom-powered merchant ship, has achieved a sustained chain reaction at The Babcock & Wilcox Company's Atomic Energy Division laboratory at Lynchburg, Va.

It is believed to be the first propulsion reactor power core to achieve criticality before installation. The test confirmed nuclear design and engineering calculations, and provided firsthand experience for the safe installation of the core aboard the ship.

- ◆ **PRECIPITATION** - Electrostatic treatment of petroleum streams to remove impurities is a relatively new, but highly accepted, engineering advance in refinery technology that cuts refining costs.

Precipitation equipment, utilizing high voltage direct current, has been used successfully in the chemical treatment of all distillates from naphtha to the lube oil boiling range. R. J. Phillips and John R. Humble, Jr., Howe-Baker Engineers, Inc., Tyler, Texas, told the 42nd National Meeting of the American Institute of Chemical Engineers in a paper given in Atlanta Feb. 23. Electrostatic precipitation has numerous advantages over gravity settling, most of which result in economic credits to the refiner, they said.

- ◆ **ULTRA HIGH PRESSURES** - several thousand atmospheres - may be a new tool in materials research and synthesis, it was reported at the 42nd National Meeting of the American Institute of Chemical Engineers.

"It is evident from the accomplishments to date that ultrahigh pressure should become an important tool in synthesis of new materials by promoting transformations and reactions in solids. As the pressure and temperature capabilities of the apparatus are improved there is little doubt that new materials having unique properties will be synthesized. Under these conditions the new products should possess higher density and hardness. Obviously, therefore, we may hope for improved abrasives and refractories."

- ◆ **SAFE COATING** — Approval by the Food & Drug Administration of "Plasite" No. 7133, a heavy duty chemical resistant coating formulated particularly for the lining of tanks and equipment, is announced by the manufacturer, Wisconsin Protective Coating Corp., Green Bay, Wisconsin.

Plasite will not impart taste and odor to such products as sugar solutions, wine, beer, meat products and similar items. It is resistant to the standard cleaning for sanitation purposes, and will withstand normal atmospheric steam cleaning procedure.

- ◆ **ATOMICS EDUCATION** — Thirty-two Georgia Power Company engineers from throughout the state were graduated recently from the company's second nuclear reactor engineering course.

The company's 1957 class in nuclear reactor engineering marked the first time such a course ever was offered by an electric utility company to its employees. The classes are part of the company's over-all program of informing its engineers of the principles of nuclear engineering. Many other large companies are also sending their engineers back to school to learn new lessons.

- ◆ **TUBES STILL USEFUL** — Although semi-conductor devices have made inroads on electron tubes, new types of the latter are continuing to appear as the field of electronics expands, two Westinghouse engineers said at the Winter meeting of AIEE. Choice depends on the needs of the designer.

Semiconductor devices have the following distinctive characteristics: They require no cathode heater power; certain types perform well at very low voltage; and generally they have low mass, with consequent excellent capability of resisting vibration and mechanical shock. Distinctive characteristics of electron tubes are: Very high electric resistance between tube elements is available for isolation of circuits; operating temperatures can exceed 175 C which is the upper limit for most semi-conductor devices, and very high voltages can be rectified, converted or utilized.

- ◆ **CHEMICALLY RESISTANT** — A new sheet packing that combines the performance features of "Hypalon" synthetic rubber and asbestos is now available for use where chemical exposure has created problems of expense, excessive maintenance, or interruption of processing.

In laboratory and field tests, the new material has shown superior resistance to inorganic acids, such as sulfuric, hydrochloric, and pickling solutions, as well as to organic acids, aromatic hydrocarbons, and general alkalies such as caustics.

- ◆ **MORE ALUMINUM** — Prospects for vigorous growth in aluminum sales during 1960 are excellent in virtually every marketing area, Derek Richardson, V.-P., Olin Mathieson Chemical Corporation, said in a year-end statement. It is widely expected that a high percentage of existing aluminum production capacity will be utilized, he said.

The coming year is expected to bring further substantial gains in the automotive, container and electrical industries, and in the building trades. Important new outlets are expected to develop rapidly from the recent advances in adhesive bonding of aluminum sheet and in surface-finishing techniques such as continuous porcelainizing of aluminum coils.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

ALLIS-CHALMERS



Microscopic view of common algae found in cooling systems.

Allis-Chalmers No. 120 Series Algaecide brings **death to all algae**

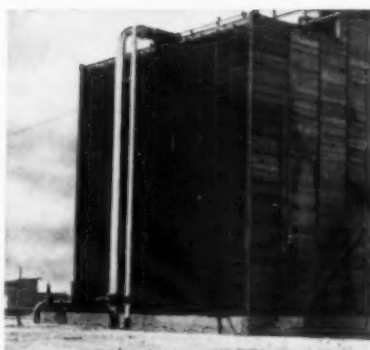
Lethal to more algae than any other algaecide! Only 2 to 5 ppm of this amazingly effective liquid does the job . . . proves the ideal solution to problems of plugged pump strainers, fouled heat exchanger tubes and coated cooling tower slats.

No expensive feeders needed . . . no application specialists required. Use pump, drip-feed or manual feed.

Safe? Even in its concentrated form, Allis-Chalmers No. 120 Series Algaecide is only a mild irritant to skin and hands. Economical, too, since there's no loss of its toxic quality on passage through the tower.

No worries about harmful side effects. Has low toxicity to fish or animals and is nonoxidizing and corrosion inhibiting. Developed after a thorough program of research and field testing—proved in over 4 years of use as the most toxic to all known organisms in cooling systems.

You can purchase No. 120 Series Algaecide directly from your nearby Allis-Chalmers office or write **Allis-Chalmers**, Power Equipment Division, Milwaukee 1, Wisconsin, for help on any of your water conditioning chemicals, equipment or service problems.



Scale and corrosion problems in cooling systems are covered in Allis-Chalmers informational Bulletin No. 74-A, "Water Treatment for Cooling Towers." Write for your copy today.

Proved 10,000 times the world over

POWELL PRESSURE SEAL VALVES



Fig. 16031—New, steel pressure seal "Y" globe valve for 600 pounds.



Fig. 11365—Steel pressure seal horizontal lift check valve for 1500 pounds. Piston guided disc.



Fig. 19003—Steel pressure seal gate valve for 900 pounds.

Powell . . . world's largest family of valves

More than 10,000 Powell Steel Pressure Seal Valves are now in use all over the world—indisputable evidence they are meeting the challenge of modern industry to control constantly higher pressures at elevated temperatures. These quality, precision-built, precision tested, leak-proof

valves, with exclusive features of design and construction, are available in gate, globe, angle, check patterns for 600 to 2500 W.P. and special working pressures. Many are in stock for quick delivery. Contact your nearby Powell distributor—or write directly to us.

THE WM. POWELL COMPANY • DEPENDABLE VALVES SINCE 1846 • CINCINNATI 22, OHIO



the SOUTH—SOUTHWEST

more power . . . more plants . . . more money



William T. Rhame, president of The Texstar Corporation of San Antonio, Texas (right) and W. I. Spittler, president of Air Accessories, Inc.

Texstar Merger — Texas

The Texstar Corporation of San Antonio, and Air Accessories, Inc. announced a merger of the two firms. Air Accessories, Inc. will continue operations at 1400 Henderson in Fort Worth, Texas under the new name **Texstar Plastics, a Division of The Texstar Corporation.**

The acquisition of Air Accessories, Inc., with its manufacturing experience and facilities in the field of plastics, is a major step in Texstar's policy of expansion.

Air Accessories is a manufacturer of formed Plexiglass marine windshields under the Del-Tex trademark. In addition to serving the marine field, the firm supplies windshields, windows and "bubbles" for the industrial and aviation field on a contract basis.

H. K. Porter — Alabama

New construction and equipment modernization of Refractories Division plants of **H. K. Porter Company, Inc.**, includes an expenditure of almost \$2 million at Bessemer, Alabama Works, where plans call for a new factory building and storage facilities, a tunnel kiln, dryers, and new brickmaking facilities. These additional facilities will make pos-

sible a marked increase in the capacity of Bessemer Works to produce ladle brick, and enable this facility to produce added lines of fire clay refractories for Southern industry.

Air Reduction — Tampa

Construction of the first commercial liquid air separation plant in the State of Florida is under way by **Air Reduction Sales Company.** The multi-million dollar installation at Tampa will have a production capacity of 25 tons of high purity liquid oxygen per day as well as liquid nitrogen and liquid argon. Groundbreaking took place in March, with completion scheduled for summer.

This facility will serve many of the industries in the Florida area. Nitrogen has an important use as a preservative in the processing and packaging of citrus fruit products. Both nitrogen and argon are used extensively as protective atmospheres in the production of electronic devices, while oxygen and argon are used in steel production, metal fabrication, shipbuilding, and aircraft and missile manufacture.

Tampa was chosen as the site for this new plant because of its central

location, facilitating the distribution of Airco's industrial gases throughout the entire state.

Rail Welding — Alabama

The first plant in the South designed for welding sections of rail immediately upon their emergence from the steel rolling mill is to be built at Ensley, Alabama, it was announced jointly by **Chemetron Corporation** of Chicago, and the **Tennessee Coal & Iron Division of United States Steel Corporation.**

The plant will be near the mill of Tennessee Coal & Iron Division, on property made available by U. S. Steel to Chemetron. It will be served by the Birmingham Southern Railroad.

From Tennessee Coal & Iron Division's rolling mill the standard-length rails will move directly into the new plant to be welded into sections anywhere from 78 feet to a quarter of a mile long. Special rail-handling equipment for the installation is being designed and built by Link-Belt Company. The welded rail will be shipped on flat cars or gondolas to points of track-laying.

Welding of rail at the rolling mill site not only eliminates the expenses of moving equipment from job to job, but permits permanent use of a well trained welding crew and assures a constant supply of rails to be welded, the companies said.

NCG obtained exclusive U. S. manufacturing rights to the patented welding system from a Swiss firm two and a half years ago. It is the first automatic electric rail welding system to be manufactured in the U. S. It performs an entire welding operation in about four minutes. Rails are fed into the welding unit where the ends are pre-heated by electric current to a plastic, molten stage. They are then welded with hammerlike upset forging blows of more than 50 tons in a process called electric flash butt resistance welding. Excess upset metal is sheared off the joint and the weld moves automatically to grinding and testing operations.

(Continued on page 16)



CLEARWATER FINISHING
GETS SAVINGS
WITH INTEREST,
USING A

PACKAGE AIR PREHEATER

Fuel savings alone pay for it in two years; installation costs cut by pre-assembly —

Savings come in pairs at Clearwater Finishing Co., with the installation of their new Package Air Preheater. This is why:

1. Initial savings on installation. You can install a Package Air Preheater at a fraction of the expense required for conventional heat recovery equipment. The unit you see in the picture is a *complete* Package Air Preheater. To put it into service you simply lift it into place, make power and duct connections. It's that fast, that easy.

2. Long term fuel savings . . . \$17,000 a year off your fuel bill (more or less, depending on size of preheater and application). What you save on fuel can pay for the Package Air Preheater within two years.

Installation savings are achieved through standardized design, which permits complete shop assembly. Fuel savings are achieved through the efficient continuous regenerative heat recovery principle, which cuts your fuel bill 1% for each 45-50°F increase in preheated air temperature.

For application ideas, and facts and figures on the potential savings, write for free 14-page booklet.

Completely pre-assembled Package Air Preheater is lifted into place at the new plant of Clearwater Finishing, (Division of United Merchants & Manufacturers, Inc.) at Clearwater, South Carolina. Installed at far less cost than a unit requiring on-site erection, this Package Air Preheater will serve a 83,000 lb/hr boiler. It measures approximately 8'x8'x6', and its 4900 sq ft of effective heating surface will recover 280°F from the stack gas.

THE AIR PREHEATER CORPORATION

60 East 42nd Street, New York 17, N. Y.
Phone: MUrray Hill 2-8250

NOW! Fuses that...

***Safely interrupt fault currents up to
200,000 amperes...***

***Limit fault current to very low values
Hold 500% load for minimum of ten seconds***

Buss Low Peak fuses can completely revolutionize the protection of the entire electrical system.

Protect Mains, Feeders, Branch Circuits, Motors, Controllers, Switches—no matter whether the fault current is 1,000 amperes, 25,000, 100,000—or as high as 200,000 amperes.

Reduce stresses and prevent damage to Panel-boards, Switches, Motor Controllers—other circuit components—because let-thru fault currents are limited to exceptionally low values.

Prevent work stoppages, lights out, waste of time and money—because long time-lag keeps them from opening needlessly on motor starting currents or other harmless overloads.

Permit increasing interrupting capacity and current limitation on present system at minimum cost.

***Before designing a new
installation—
or modernizing old
installations—***

GET ALL THE FACTS



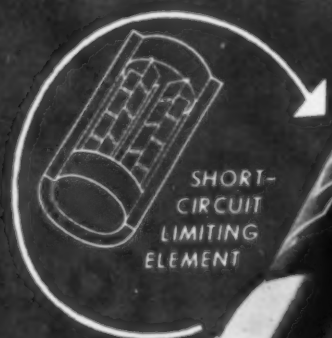
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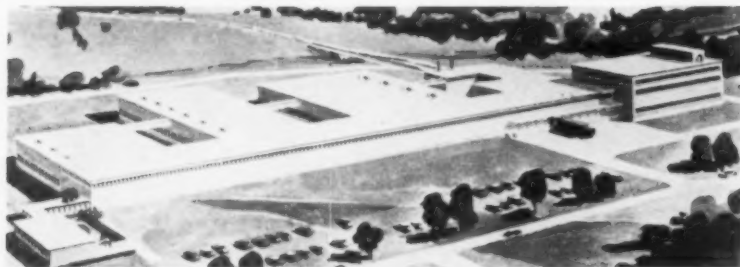
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BPI-660

News of the South-Southwest — more power . . . more plants . . . more money



Eagle-Picher Plant — Ark.

The Ohio Rubber Company, a division of **The Eagle-Picher Company**, announced plans for construction of a new plant at **Fort Smith, Arkansas**.

The new plant, scheduled for completion around February 1, 1961, will be 190,000 square feet in area and will cost around \$3,000,000. Initially employing approximately 250 people, its design will permit prompt and economical expansion expected at a later date.

The Fort Smith plant will com-

bine the newest engineering and manufacturing concepts in the mechanical rubber goods industry. It will initially manufacture automobile floor mats; molded precision rubber parts for automotive, oil field, and general industry; and semi-pneumatic tires for industrial, agricultural implement and other applications.

The Fort Smith plant is near large automobile assembly plants, is well situated to supply the growing needs of the petroleum industry, and is in a strategic position to participate in the rapid industrial expansion of the South and Southwest.

Instrument Conference Pensacola, Florida

The Sixth Annual **Southeastern Instrument Society of America Conference & Exhibit** and **First Pulp and Paper Division Symposium** will be held in Pensacola April 27-29, 1960, as announced by W. H. Matthews, General Chairman.

The Instrument Society of America was formed in 1946 "to advance the arts and sciences related to the theory, design, manufacture, and use of instruments and controls in the various sciences and technologies." ISA today is the acknowledged spokesman for the growing profession of instrument engineering. It is composed of more than 11,000 members and is organized into about 90 local Sections in the United States and Canada.

During the period April 27-29 there will be 13 papers presented on the pulp and paper industry, 6 on missile and aircraft instrumentation, and approximately 14 concerned with chemical and general industry. In addition to these papers there will be a management forum, where management personnel will have an opportunity to discuss their instrument problems not only with instrument engineers and instrument vendors but among themselves as well.

In addition to the papers mentioned above, an Education Workshop will be held at The Pensacola Junior College. The theme of this workshop will be "Status of Instrument Education." Thirteen papers will be presented on various phases of instrumentation education, and registrants will also tour the new Pensacola Junior College Instrumentation Technology Laboratory.

During each afternoon and evening over 200 manufacturers and their representatives will display and demonstrate their latest products at the New Pensacola Municipal Auditorium.

One of the prime factors for choosing Pensacola as the site of this conference and exhibit, even above the fact that Pensacola is a natural playground area, is that this area is one of the most rapidly expanding industrial areas in the Southeast. The Southeastern United States has for years and is today experiencing the growing pains of ever increasing industrial activity. Due to this factor it is expected that between 1,700 and 2,000 members of Southeastern industry will be in attendance.

FUTURE EVENTS of Engineering Interest

April 4-5: ASME Solar Energy Symposium, Room 512, Engineering & Industries Bldg., University of Florida, Gainesville, Fla. Prof. John C. Reed, Head, Mechanical Engineering Dept.

April 18-20: Southern Metals Conference, American Society for Metals, Tutwiler Hotel, Birmingham, Ala. J. R. Kattus, Chm. '60 SMC, Southern Research Institute, 2000 Ninth Ave. South, Birmingham.

April 20-22: Symposium on Instrumentation for the Process Industries, Chemical Engineering Dept., Agricultural & Mechanical College of Texas, College Station, Texas.

April 26-28: 41st Annual Convention & Welding Exposition, Biltmore Hotel & Great Western Exhibit Center, Los Angeles, Calif. Information Center, American Welding Society, 33 W. 39th St., New York 18, N. Y.

April 27-29: Sixth Annual Instrument Society of America Conference and Exhibit, and **First Pulp**

and Paper Division Symposium, Pensacola, Florida. G. W. Howlett, P. O. Box 4426, Pensacola, Florida.

April 27-29: 39th Annual Convention, Natural Gasoline Association of America, Rice Hotel, Houston, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

May 5-6: 1960 Protective Relaying Conference, Georgia Tech School of Architecture Auditorium. Director/Short Courses and Conferences, Georgia Institute of Technology, Atlanta 13, Ga.

May 9-13: 2nd Southwestern Metal Exposition & Congress, American Society for Metals, State Fair Park & Sheraton Hotel, Dallas, Texas. Allan Ray Putnam, Mg. Dir., ASM, Metals Park, Novelty, Ohio.

May 11-14: 1960 Spring Meeting, Fluid Controls Institute, Inc., The Greenbrier, White Sulphur Springs West Virginia. E. R. Rath, Exec. Sec'y, Box 667, Pompano Beach, Fla.

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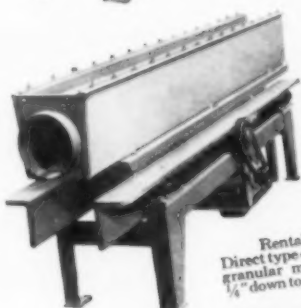
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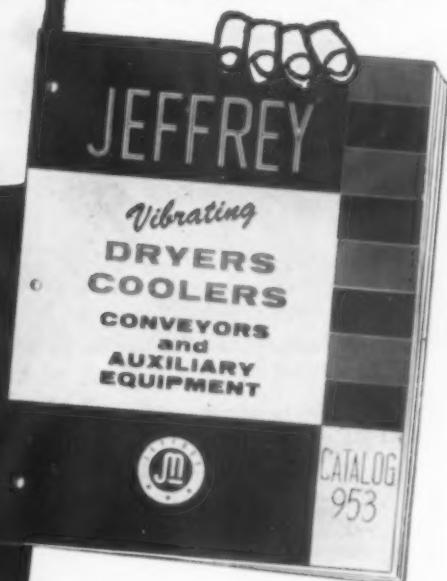
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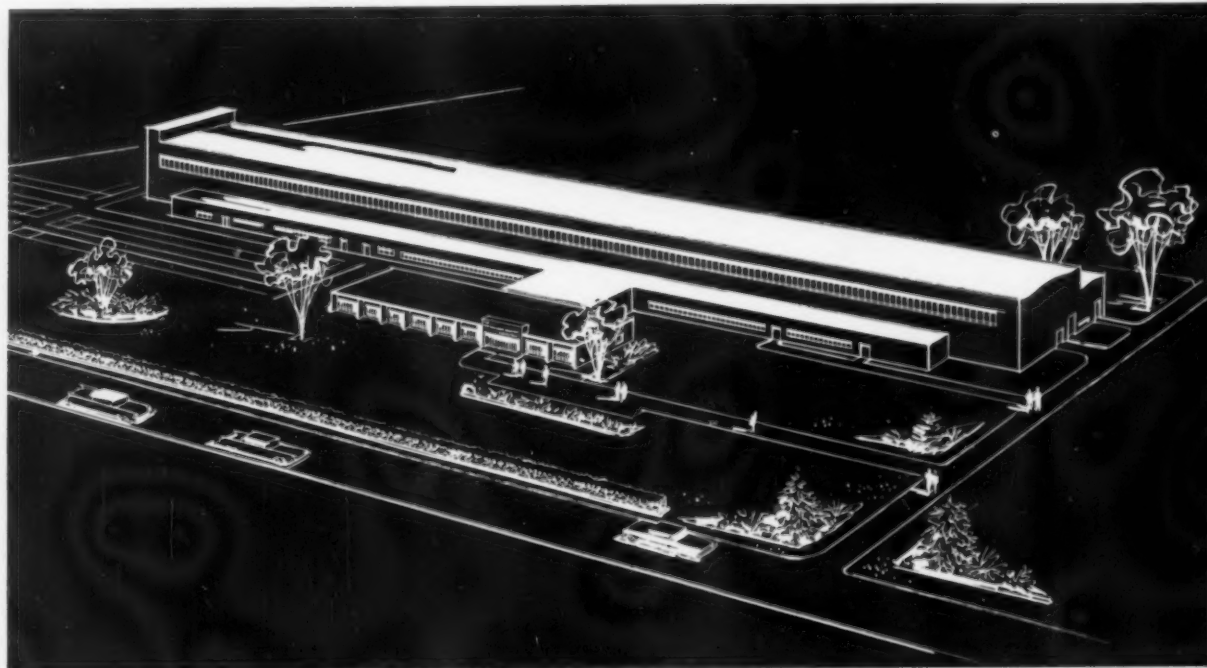
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To Serve Electric



Artist's conception of Kellogg's new Power Piping Division headquarters and plant at Williamsport, Pennsylvania. The entire site covers about 50 acres.



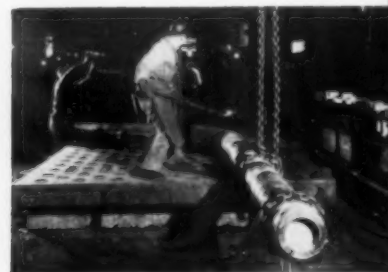
As operating temperatures and pressures increase in central power generating stations, the need for stronger and superior materials, and for better methods of manufacturing power piping systems, becomes more acute.

To help solve these problems, The M. W. Kellogg Company's Power Piping Division is building new metallurgical and welding laboratories as part of its complete manufacturing facilities at Williamsport.

The laboratory facilities and personnel, in addition to performing applied research and development for manufacturing power piping, will be available for consultation with clients on their problems and will act as a customer service laboratory.



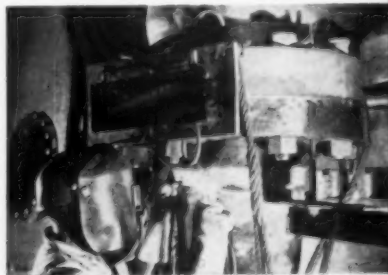
In the laboratory, a Kellogg metallurgist places sample of austenitic steel in heat-treating furnace. After heat treatment, the steel sample will be cut into sections and tested.



In the pipe bending shop, a length of stainless steel piping is bent to close tolerances. Dam in pipe retains inert gas introduced during heat treating to prevent oxidation.



In the welding shop, two heavy-walled sections of stainless steel power piping are joined by K-Weld—an inert gas-shielded technique of arc welding, patented by Kellogg, which assures long life.



In the customer's plant, a Kellogg operator uses K-Weld to install heavy sections of power piping which carry superheated steam from boilers to generators.

Utilities Still Better

Power Piping Division of M. W. Kellogg is Building New Headquarters and Manufacturing Plant in Pennsylvania

To still further improve the service it has given to electric utilities for over 40 years, the Power Piping Division of The M. W. Kellogg Company is now building new headquarters and a plant at Williamsport, Pennsylvania.

To be completed by Labor Day, the plant will specialize in the manufacture of high pressure, high temperature alloy and carbon steel piping for electric generating stations. Centrally located in Pennsylvania, Kellogg's Williamsport plant will be within easy distance from many Eastern industrial centers. From here, it is well situated to serve clients by road, rail, or air.

Representing an investment of approximately \$4 million, these new facilities will have no equal in the power piping industry. Incorporating the most modern and time-saving equipment, the facilities have been designed throughout for maximum efficiency and economy.

With completion of its new plant, Kellogg will be better equipped than ever to start with any power piping problem from scratch, and to carry it through to the actual installation in customers' central stations from coast to coast.

At its new plant, Kellogg will have the engineering skills to manufacture complex piping systems; the men and equipment to cut, machine, bend, weld and heat treat piping of varying sizes and wall thicknesses.

Here, Kellogg will have the equipment to make electronic, radiographic, ultrasonic and other advanced tests to inspect the quality of the finished product. Here, it will have the metallurgical and welding laboratories to evaluate new and superior piping materials; to maintain a continuing program of development in welding and other manufacturing techniques, and add still further to its line of industry "firsts" listed at the right.

Kellogg's Power Piping Division welcomes inquiries on its new facilities from engineers of power generating companies, consulting engineers, and manufacturers of turbines, boilers, and allied equipment.

OTHER KELLOGG FIRSTS IN POWER PIPING

In 1931, Kellogg manufactured the first all-welded piping for the first high-temperature, high-pressure central station in the United States. Kellogg manufactured the first austenitic steel piping for a central station installation and has been continually experimenting since to establish the best materials, manufacturing techniques and heating cycles for welding and post-welding treatment, and to set specifications for electrodes.

FIRST IN MANUFACTURING OF:

Piping from C $\frac{1}{2}\%$ Mo
Station piping for 900 F.
Station piping for 950 F.
Station piping for 2200 psi
C $\frac{1}{2}\%$ Mo piping with
#3-#5 actual grain size
 $\frac{1}{4}\%$ Cr- $\frac{1}{2}\%$ Mo steam piping
Steam piping for 1000 F.
 $\frac{1}{2}\%$ Cr- $\frac{1}{2}\%$ Mo station piping
2% Cr- $\frac{1}{2}\%$ Mo station piping
Station piping for 1000 F.
 $2\frac{1}{4}\%$ Cr-1% Mo station piping
 $1\frac{1}{4}\%$ Cr- $\frac{1}{2}\%$ Mo station piping
1% Cr-1% Mo V turbine piping
 $2\frac{1}{4}\%$ Cr-1% Mo V station piping
Station piping for 1050 F.
3% Cr-1% Mo station piping
Type 347 stainless turbine piping
Mercury vapor piping for 1000 F.
Station piping for 1003 F. for France
Type 347 stainless station piping
Station piping for 1100 F.
Type 316 stainless station piping
Type 316 stainless station piping for
3500 psi-1050 F., 325 MW
Type 316 stainless station piping for
5600 psi-1200 F., 325 MW



POWER PIPING DIVISION • THE M. W. KELLOGG COMPANY

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Offices of Kellogg subsidiary companies are in Toronto, London, Paris, Rio de Janeiro, Caracas, Buenos Aires.

News of the South-Southwest — more power . . . more plants . . . more money

PLANT PERSONNEL

Thomas S. Martin, Jr., formerly superintendent of System Operation, Power Department, Virginia Electric and Power Co., is now manager of System Planning, Engineering and Construction Department, replacing George M. Tatum, deceased. Replacing Mr. Martin is **Eugene B. Crutchfield**, former company operating engineer, Power Department. Mr. Martin, a native of Washington, D. C., attended the University of Virginia. He joined Veeco at Charlottesville in 1928. Mr. Crutchfield, a graduate of North Carolina State College, joined Veeco in 1933 at Roanoke Rapids.

L. E. Dequine, Jr., manufacturing manager of Chemstrand's Pensacola nylon plant, was selected to attend the Advanced Management Program for senior executives at the Massachusetts Institute of Technology. Mr. Dequine joined Chemstrand in 1951 and served successively as plant engineer and assistant plant manager before being promoted to his present position in 1958.

Lance, Inc., Charlotte, N. C., recently announced the following promotions: **Phil Van Every** has been elected chairman of the board after having served as president since 1943. **James B. Meacham, Jr.**, formerly executive vice-president, was elected president. **Glenn G. Rhodes**, formerly vice-president in charge of manufacturing, was elected executive vice-president. **John L. Stewart**, formerly assistant vice-president of manufacturing, was elected vice-president in charge of manufacturing.

Henry C. Willms, superintendent of Reynolds Metals Company's Listerhill reduction plant in Alabama, has been promoted to manager of the Jones Mills, Ark., reduction plant. He succeeds Alex Leipper, who is now with a Canadian affiliate of Reynolds.

Grover C. Paulsen, Jr., has been appointed vice-president and technical director of Coastal Chemical Company, Savannah, Georgia. Mr. Paulsen, a native of Savannah, is a graduate of Clemson College and the Massachusetts Institute of Tech-

nology, and has had extensive experience in the chemical field.

John E. Spalding is plant manager of Marathon Southern Corporation at Naheola, Alabama, where a major expansion program is in progress.

W. I. Spitler is general manager of the Texstar Plastics manufacturing facilities in Fort Worth, Texas. Mr. Spitler was president of Air Accessories, Inc., before the merger with The Texstar Corporation of which he is now a vice-president.

Harry D. Ferguson has been named purchasing agent at Rockwell Manufacturing Company's Instrument Division in Tulsa, Oklahoma, where **William H. Shenkle** is general manager of the plant.

Clyde Skeen, who was formerly with Boeing Airplane Company, is now executive vice-president and general manager of Temco Aircraft Corporation in Dallas.

Marathon Expansion — Ala.

Marathon Southern Corporation's third paper making machine is scheduled to go into production by mid-summer at Naheola, Ala.

The new Black-Clawson machine is expected to start producing various weights of paperboard just two years after start-up of this plant on the Tombigbee River in western Alabama. The plant is now operating at its 300-ton capacity with a Yankee machine turning out Northern tissue and a versatile Fourdrinier turning out a variety of papers. Tissue is converted into retail products for the Southern market.

Capacity of Number Three will be approximately 300 tons of bleached board a day and it will be equipped with a 238-inch wire. Length of this machine is 545 feet and it is housed in a building 85 feet wide and 830 feet long.

Addition of the machine will necessitate additional steam and power facilities, an additional pulp digester, and additions in the plant's causticizing area. The machine is expected to more than double the plant's present paper-making capacity.

Construction of machine housing and machine installation is being

engineered by The Rust Engineering Company and coordinated by Marathon's central engineering staff. Marathon engineers have worked closely with Black-Clawson personnel in designing the new machine to meet specific needs at Naheola.

Federal Pacific Names Dallas Plant Manager

Federal Pacific Electric Company has appointed **Ernest L. Cahlik** plant manager of the Dallas Customer Service Center.



Each of the Customer Service Centers is an integrated manufacturing, engineering, sales and warehousing facility designed to serve local electrical equipment markets. The company has, at present, nine such installations in key cities across the country.

Mr. Cahlik joined the electrical manufacturing firm in 1953, advancing successively to the positions of engineering manager and plant superintendent. Before that, he served for ten years as a control systems designer with Westinghouse Electric Co.'s Cleveland Office.

General Electric Co. — Ga.

A. J. Hill has been named sales manager at General Electric's Medium Transformer Department, Rome, Ga.

Mr. Hill is a native of Greenwood, Miss., and was graduated from Mississippi State College in 1940. He joined General Electric on the engineering test program. After a year and a half he was transferred to the Switchgear Department, and from there to Atlanta, Ga. In 1949 he moved to the Raleigh, N. C., Apparatus Sales office and served as manager for seven years. Prior to his new appointment he was manager at General Electric's Columbia, S. C., office of User Industry Sales.



Make Certain the BEARINGS you buy are in the MAKERS' SEALED BOXES

And what is so important about a manufacturer's box? Just this; surplus bearings or shelf worn bearings are usually shipped in one large package. Or, if individually wrapped, in plain boxes—often without any identification, usually of ancient "vintage". . . and bearings do not improve with age.

Bearings from our stocks are always sold just as they

arrive from the manufacturer—fresh, fully protected and guaranteed to be first quality by the maker and ourselves.

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INDUSTRY SPEAKS



We Must Make Products That Can Compete

Abstracted from a speech by ARTHUR V. WIEBEL, president of Tennessee Coal & Iron Division given in Birmingham, at the Thirteenth Annual Seller-Buyer Dinner of the Purchasing Agents Association of Alabama.

AMERICA for many years held a favorable balance of trade in the world. This was so because our productive genius enabled us to make many products and to sell them cheaper than manufacturers in other nations.

We pioneered the techniques of mass production and distribution. With our talents for organization, we developed specialized ways for each workman to mesh his skill with others in order to produce great quantities of quality goods at low cost. . . . And as output multiplied, we could divide the resulting progress in terms of better wages and more leisure and still sell more first-rate goods cheaper than our foreign competitors.

That was yesterday. What is the situation today? In many fields, in many products, Uncle Sam is ceasing to be a net exporter and is becoming a net importer. In textiles, automobiles and a wide variety of consumer merchandise, we are witnessing an ever-broadening stream of goods coming into the American market place, taking the sales which once went to American-made goods.

The situation is particularly serious to the steel industry. Almost 1,800,000 tons of foreign steel came into our Southern ports last year — almost as much as came into the whole country the year before. If that steel had been made in Southern plants, it would have provided jobs for about 14,000 Southern steelworkers. But that is by no means the whole story.

That 1,800,000 tons of steel might have meant the following things to the South if it had been produced here: It might have meant 27,510 homes; it would have represented 22,400 automobile sales; it might have kept 2,240 retail stores in business and provided income for 1,680 professional men.

The American steel industry is still doing pretty well in terms of technology and organization for production, but there are other factors which have taken away much of the competitive edge which the Americans formerly enjoyed.

Several ways might be employed to meet foreign competition. Artificial trade barriers such as tariffs, embargoes and boycotts might possibly offer some temporary relief, but these are unwise and no solution to the basic problem.

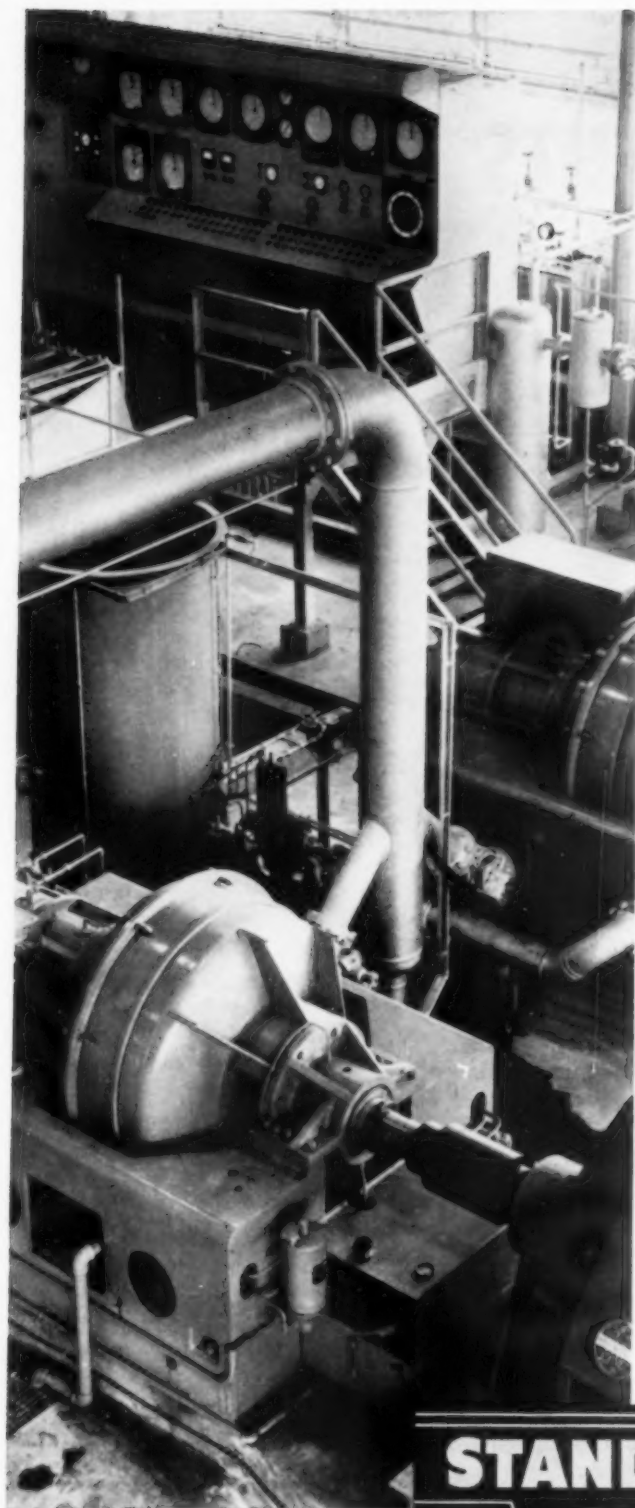
About 1,000 American companies have built plants abroad to gain the benefits of less expensive foreign labor. Steel companies have not generally followed that course. But the fact that there is even talk of building more plants outside our country should be weighed very thoughtfully by labor leaders and by all who are concerned about our national growth and industrial strength.

What we can do now about foreign competition depends largely on how well we do three things: first, through research and development how well we develop new methods and better products; second, how well we continue to improve our productive efficiency; and third, how well we sell and service our products.

As we find and put into practice new ways of doing work more efficiently, we inevitably end the waste of human effort. Putting an end to wasted human effort does not mean that the man whose job may be affected must necessarily be laid off. As a matter of fact, nearly a hundred thousand jobs open up in the steel industry each year . . . and these jobs must be filled either by retraining experienced steelworkers moved from other jobs, or by hiring and training new and inexperienced people.

The only way the steel industry or any other American business can protect the job of an American working man is to be able to compete for business. And that means making steel or any American product so efficiently that American production costs are held down to competitive levels.

Our competitors in free Europe and in Asia are in a determined struggle to raise their standard of living. In so doing they are merely following the prescription we have written. We should be proud, I believe, of the economic medicine we have provided the nations of the free world. We have thereby helped them to regain their economic health. Having done so, we must now learn to cope with these more lively and vigorous competitors.



experience has a cash value

In serving Southern industry with dependable lubricants for seventy-four years, our lubrication engineers have acquired experience that can be valuable to you. This experience is backed up by the combined facilities for testing and research behind Standard Oil lubricants that are unequalled.

Whatever your requirement may be — there's a Standard Oil lubricant designed to do your particular job with economy, dependability and efficiency.

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LUBRICANTS

TIMELY COMMENTS



Two du Pont Engineers Emphasize Need for Care in Approaching Automation

Complex Instruments

AN OVERSUPPLY of complex instruments, instead of providing safety and efficiency in boiler operations, may be paving the way for major catastrophes, according to an engineering report delivered at the Annual Meeting of ASME. The speaker called on his audience to help prepare a safety code to eliminate this danger.

There's nothing wrong with the instruments, which provide controls for the boilers and indications as to what's going on inside, M. L. Jones, principal power engineer for E. I. du Pont said. But "a sometimes oversold, highly instrumentized boiler frequently results in a management decision that no operator is required or that the unit can be maintained by anyone regardless of qualification." Serious complications arise when such an operator is unable to interpret any malfunction of equipment and cannot take preventive steps to correct it. Failure to maintain the units correctly or to test them regularly also results in dangerous situations.

Mr. Jones asked that ASME establish an operational procedure for protecting industrial furnaces from explosions. In the present absence of such a code, he suggested several courses to produce increased boiler safety. First, he said, the proper balance between automatic operation and qualified human supervision should be maintained, so that a highly trained man does not find himself nursing a set of gauges or a boiler operator called

on to be responsible for the interpretation of a set of complex instruments.

Secondly, the instruments should be completely suited to the boiler. Flame failure, or interruption of the flame in the furnace, for example, is a major contributor to furnace explosions, but it is very difficult to detect properly.

One of the most important deterrents to explosions is regular maintenance by trained personnel, Mr. Jones said. Today's instruments are electronic and electrical in operation and require more complex knowledge than a boiler operator may be able to bring to the task.

Study Before Purchase

THE CHEMICAL INDUSTRY was advised to study the question of automation before leaping to buy costly computer equipment in a paper by C. R. Hall, of the Engineering Department of du Pont, delivered at a symposium on computer control during the Winter Meeting of AIEE.

Pointing to the furor caused by automation in other manufacturing processes and the doubtful results sometimes obtained, Mr. Hall said: "A similar stage appears to be set in the field of application of digital computers for control of chemical processes. There is much talk in broad generalities of the push-button plant; of a digital computer (perhaps even located in a distant city) controlling vast chemical plants. There is much secrecy surrounding the specific ap-

plications that are in operation today — at least few published results of accomplishment. There is a popular word being bandied about as was "operations research." Now it is "optimize" — a word not even in the dictionary.

"Are we going to pass through the same type of growing pains as before, or are we going to approach the problem rationally with careful analysis before leaping to buy equipment? Despite the current pressures of competition among the makers of process control computers, it is believed that they also support a thorough analysis before purchase. They, too, want to have a record of successes rather than some economic black eyes which could only prolong the time of general acceptance of control computers as standard process equipment."

Mr. Hall made the following recommendations for those who are examining systems for improvement of process control:

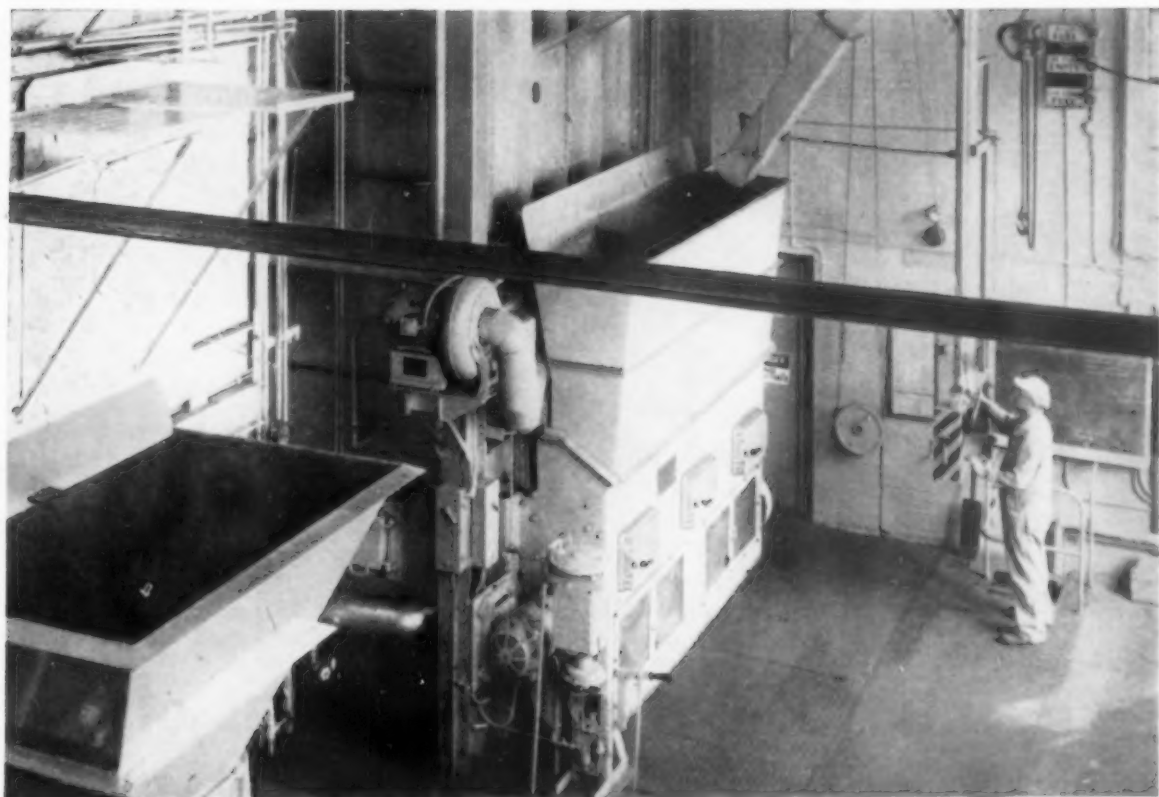
"Seek lower cost alternative solutions to the problems at every step of the way. Bringing in someone unfamiliar with computer control possibilities is a big help.

"Have a strong mathematician and/or statistician on the team. He must have a degree or practical experience in the sciences as well.

"Seek out situations where there are uncontrollable independent variables (or random upsets) which change fairly rapidly with time and where there are two or more controllable independent variables.

"Seek out interaction between independent variables upon the results desired. If there is no interaction, there may be no real problem."

at S. C. Johnson & Son, Inc.



On the line in October 1954, this 40,000-lb B&W boiler, fired by AE Vibra-Grate Stoker, has never had an unscheduled shutdown. Cost of repairs to previous stokers ran close to \$1000 per year.

Five-year repair bill for Vibra-Grate Stoker... only \$188!

(vs previous stoker costs of \$1000 a year)

The AE Vibra-Grate Stoker installed at S. C. Johnson & Son, Inc. (makers of Johnson's Wax Products), Racine, Wisconsin, continues to prove every performance promise ever made for Vibra-Grate Stokers.

Read these highlights from the company's five-year maintenance report, just released:

No unscheduled shutdowns. Savings of 919 tons of coal per year. No fly ash collector needed. No trouble with clinkering or coking coals. Peak efficiency at plant loads from 4000 lb per hour to 45,000 per hour. Load swings of 15,000 to 20,000 lb with only 3 to 4 lb variation in pressure.

Finally, total repair costs only \$188, while burning 34,962

tons of coal . . . just slightly over 1/2 cent per ton of coal!

The AE Vibra-Grate Stoker is the only stoker which combines the long life and low maintenance of water-cooled grates with the high efficiency of vibrating grate feed and controlled zone undergrate air. No other stoker cuts maintenance costs so drastically, gives such highs in efficiency. Get the complete design and operating story. Write today to Dept. S-103 for our Vibra-Grate Stoker Catalog S-546-A.



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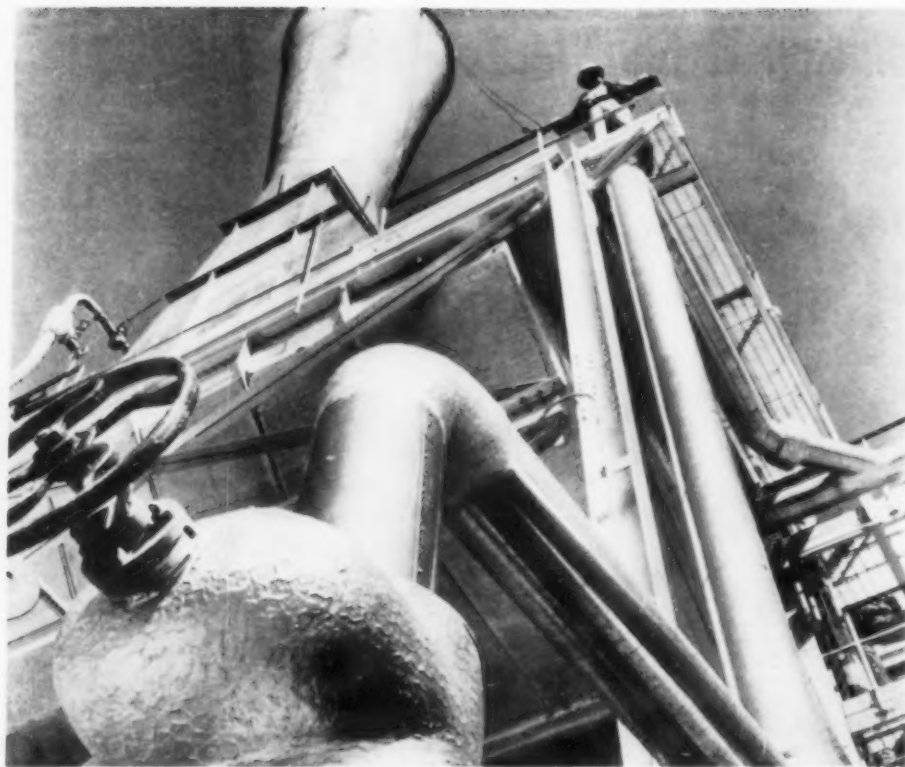


Fig. 1
Line and fittings
carry
400 F steam

Insulation Selected on Basis of Efficiency at Lake Charles Refinery

EACH INSULATION material is most efficient within a given temperature range. Thus, if ideally applied, each layer of insulation would be of a thickness such that the temperature differential between the hotter and cooler sides represents the material's most efficient temperature range.

This was the principle behind the insulation of Cities Service Refining Corp.'s Lake Charles, La. refinery, part of the recent \$22 million expansion program for en-

By **R. M. SKINNER**
Fuller-Austin Insulation Co.
Houston, Texas

larged production of higher octane gasolines. Here Thermalite 85 per cent magnesia and Thermafil calcium silicate, manufactured by Baldwin-Ehret-Hill, Inc., were specified for most processing towers, tanks and hot fluid lines.

Where operating temperatures exceed 550 F, Thermafil, a hy-

drous calcium silicate compound was applied as the first layer in thicknesses that reduced the temperature at its outer surface to less than 550 F. Thermalite, a molded insulating material which is most efficient between 100 F and 550 F was then placed as a second layer, over Thermafil. For operating temperatures below 550 F, a single layer of Thermalite was used.

Different Forms and Arrangements

While insulation types were chosen according to surface temperatures, the form and arrangement of insulating materials depended largely on the size and configuration of the equipment or pipe.

In general, the contractor, Fuller-Austin Insulation Co., Houston, Texas, used half-round sectional insulation on all piping up to 18-

SEE PHOTOGRAPH ON COVER — — — — —

Bottom line of processing tower at Cities Service Refining Corp., Lake Charles, La. refinery yields heavy gas oil at 20 psi, 600 F. Double layer insulation consists of inner layer of calcium silicate and outer layer of 85 per cent magnesia. Top and middle lines which yield kerosene and light gas oil at 410 and 500 F respectively, are insulated with 1-in. and 1½-in. of the same materials. — — — — —

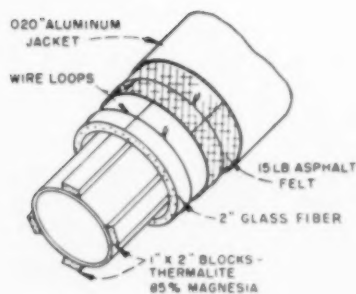


Fig. 2. Pipeline carrying 220 F residue from toppers to a lubrication oil plant is insulated with four longitudinal strips of Thermalite, then wrapped with glass fiber and an asphalt felt vapor barrier. Insulating materials are secured with wire loop and the aluminum is secured with a band.



in. diameter. On pipes larger than 18-in., a segmental form of insulation was applied, i.e., more than two segments were required to cover the 360 degree pipe surface.

In both cases, joints were staggered, the material secured to the pipe by wire bands on 18-in. centers, and the insulation finished with 15-lb asphalt and .02-in. thick aluminum jackets.

Since both types of insulation are molded to exact finish size, the surfaces on the inside and outside diameters are tough, smooth and free of dust and dimensions are held to very close tolerances to assure a snug, uniform fit. Availabil-

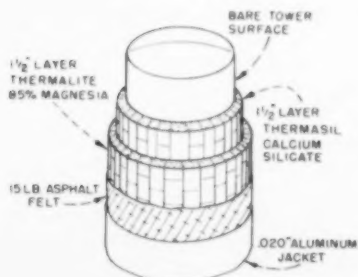
ity in sectional form for large pipe sizes results in lower application costs.

An interesting method was used to insulate the pipe line which carries residue at 220 F from toppers to a lubrication oil plant (Figure 1). Here, 1-in. by 2-in. blocks of Thermalite were placed 90 degrees apart on the pipe (Figure 3). A 2-in. layer of glass fiber insulation was placed over the blocks, leaving an air space between the fibrous felt and the blocks, which provides an additional insulation.

The felt was secured with wire bands and then covered with a vapor barrier of 15-lb asphalt felt. An outer jacket of 0.020-in. aluminum was secured with aluminum bands.

The block form of insulation was also used on tanks and towers. Vacuum towers (Figure 3) were insulated with a double layer of blocks, consisting of an inner layer of Thermalite, and an outer layer of Thermasil. Asphalt felt was then applied and an aluminum jacket placed over it.

Fig. 3. Vacuum tower at left where temperature ranges up to 770 F, and two hydroformer preparation towers have double-layer insulation covered with asphalt felt and aluminum.



Plant Services



Eighteen million gallons of water are treated daily in this modern, municipal-type filtration plant.

Steam Electricity Water Air Facilities

A SECOND BOWATERS mill has been placed in operation in the South. It is the 400-ton sulphate pulp mill of Bowaters Carolina Corporation, located at Catawba, S. C., near Rock Hill. Production began at this second Bowaters installation on July 17, 1959, approximately five years after the startup of the newsprint mill of Bowaters Southern Paper Corporation at Calhoun, Tenn.

At the same Catawba location construction is moving ahead on a plant for Bowater Board Company, which is to be the first hardboard mill on the East Coast. Production is scheduled to start this year, using about 40,000 cords of hardwood annually. Engineering and construction supervision for the Carolina project was handled by Bowaters Engineering and Development Incorporated, Calhoun, Tenn. Work on the general grading for the project began on April 22, 1957, under a contract with Boyle Construction Company of Sumter, S. C. The general contract for erection of the mill was awarded to Daniel Construction Company of Greenville, S. C. on August 15,

1957. One year and 11 months later the first salable pulp was produced.

Capacity of Mill

The initial design capacity of the mill is approximately 400 tons per day semi-bleached kraft pulp. Adequate provisions for future expansion have been provided throughout the entire mill.

Daily chemical consumption is approximately 20 tons of salt cake, 25 tons of chlorine, 10 tons of caustic and 18 tons of lime.

Initially the plant employs approximately 350 persons. An equivalent number is employed by independent contractors for pulpwood production. The payroll is now \$3,000,000 annually, and a greater amount is paid in connection with wood procurement. The pulp mill requires about 275,000 cords of pine per year, of which about 10 per cent will be supplied in the form of chips made from sawmill waste.

Wood Handling

Wood received by truck is unloaded by a 50 ton crawler type

crane and delivered to storage piles or directly into a flume leading to the barking and chipping facilities. Wood delivered by rail may be unloaded to storage piles by means of a 50 ton crawler crane or into the flume by a self-propelled rake. Two 10,000 gpm vertical pumps circulate the water through the flume at the rate of five feet per second.

Bark is conveyed through a swing hammer shredder to a 14,000 cubic foot capacity circular bin and then to the combination boiler for fuel. Logs from the debarkers pass over a series of conveyors to a 66 inch wide sorting belt, where accepted logs are fed to the chippers.

Chips are removed from the silos by rotary plate feeders and are conveyed through a weightometer to the digester building. Chips are fed to the digesters by means of a belt conveyor and a motor propelled tripper.

A separate system has been provided for handling of purchased chips. A pit has been designed to receive chips from either hopper or side discharge rail chip cars.

..... Bowaters Carolina Corporation



This new sulphate pulp mill is the second Bowaters mill in the United States. It is operated by Bowaters Carolina Corporation, and represents an investment of \$37,000,000.

Chips are removed from the pit by means of a chain conveyor and transferred to a belt conveyor which discharges into a pneumatic conveying system which takes them to the cyclones and the chip screens.

Digesters

There are five pulp digesters which discharge through electrically operated blow valves into the blow tank which has a capacity of two and one-half digesters.

The blow steam passes through a special cyclone in the head of the blow tank to an accumulator and blow steam recovery system for the heating of water.

The relief steam from the digesters is carried to individual separators, thence to a relief cyclone, condenser, and decanter for the recovery of crude turpentine.

Washing and Bleaching

The stock from the blow tank is pumped through a specially designed trap and an electro-magnet to the refiners. For washing of the pulp, three vacuum type washers have been provided. The stock

from the final washer is delivered by a belt conveyor to a high density tank.

The washers are located on the same floor level as the digester charging floor and are provided with hoods and exhaust fans. A 30 ton hand operated bridge crane serves the washer operating floor.

From the screened stock chest in the screening area, the pulp is pumped at a regulated consistency through jordans and a magnetic flowmeter to the chlorination stage of a three stage bleach plant.

Pulp Drying

The pulp dryer, which utilizes a very high velocity stream of heated air to convey the pulp sheet through the machine, is the first of its type to be used in North America. This type of machine has proved to be superior to machines in which the sheet is conveyed by mechanical means since the air is used to convey the sheet and dry it at the same time.

Heat for the dryer is provided by steam coils which are supplied with 150 psig saturated steam. An economizer is mounted on the roof of

the dryer building to recover the major portion of the exhaust heat from the dryer. This heat is used to preheat the fresh air make-up to the dryer and the heating of water for the sheet former.

Finishing and Shipping

Pulp leaving the drying machine is fed into a cutter and layboy where it is cut into 26 inch by 32 inch sheets and accumulated in stacks weighing approximately 450 pounds. The cutter is equipped with a dual set of slitters to cut either wrappers or sheets for baling. Stacks of sheets are conveyed from the cutter and layboy to a set of scales for adjusting the weight of each bale.

From the scales the stacks are conveyed to an 800 ton capacity baling press. The bales are then wrapped and wires applied by means of semi-automatic wiring tools. Wired bales are then conveyed to a stacker which accumulates the bales in piles of five and automatically lowers them to ground level for shipment. Finished bales are conveyed from the ground floor level to railroad cars



Waste water flows into one of two sedimentation basins for removal of solids. One basin may be cleaned while the other is in use. Aprons and weirs provide aeration. Still more dissolved oxygen is restored during storage. A large lake makes it possible for water to be returned to the river in accordance with stream flow.

by means of fork lift trucks.

A power plant which is designed to furnish the steam and electrical requirements for the mill is centrally located on the plant site. The principal equipment consists of one combination bark, oil, and gas boiler, one chemical recovery boiler, and one automatic extraction, condensing type turbine-generator. The power plant is of semi-outdoor design and has been arranged for future expansion.

Power Plant

The combination boiler is a two drum, sterling type with a full water-cooled furnace and a roto-grate spreader stoker. The design incorporates provision for future burning of coal. The steam capacity is 300,000 lb per hour of 850 psig, 900 F total temperature measured at the superheater outlet.

The maximum continuous rate for burning bark alone is 75,000 lb per hour which generates 200,000 lb per hour of steam. A spray type atomizer located in the steam line between the first and second stages of the superheater maintains steam temperature at 900 F.

The forced draft fan delivers 143,000 cfm of 100 F air at 11 inch-

es water pressure and is driven by a 350 hp 1200 rpm induction motor. The capacity of the induced draft fan is 308,000 cfm of 470 F gas at a negative suction of 13 inches of water. It is driven through a hydraulic coupling by

a 900 hp, 900 rpm motor.

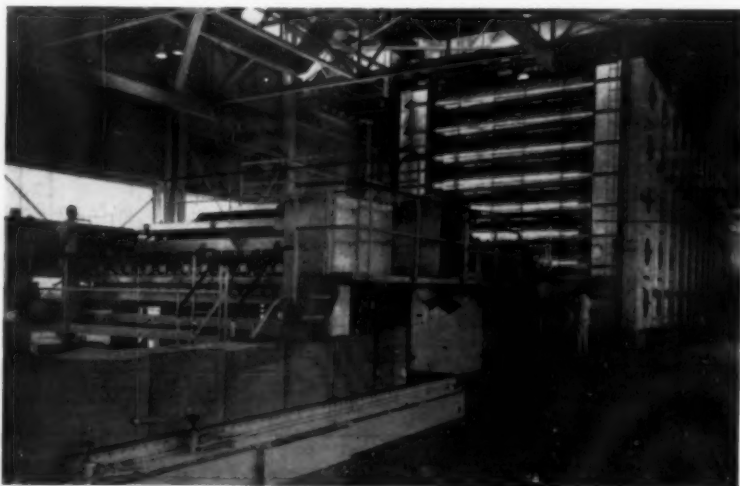
A horizontal continuous tube economizer, a dust collector and manually operated steam soot blowers are other component parts of the power boiler.

A chemical recovery boiler including a cyclone evaporator arrangement is provided. The unit is designed to burn 1,350,000 lb of black liquor solids per day and generate 208,000 lb per hour of 850 psig, 825 F total temperature steam.

The water-cooled, chrome ore lined furnace floor slopes to twin smelt spouts discharging into a 22 foot diameter lined dissolving tank. Side entering propeller type agitators plus green liquor recirculating pumps keep the liquor in constant motion.

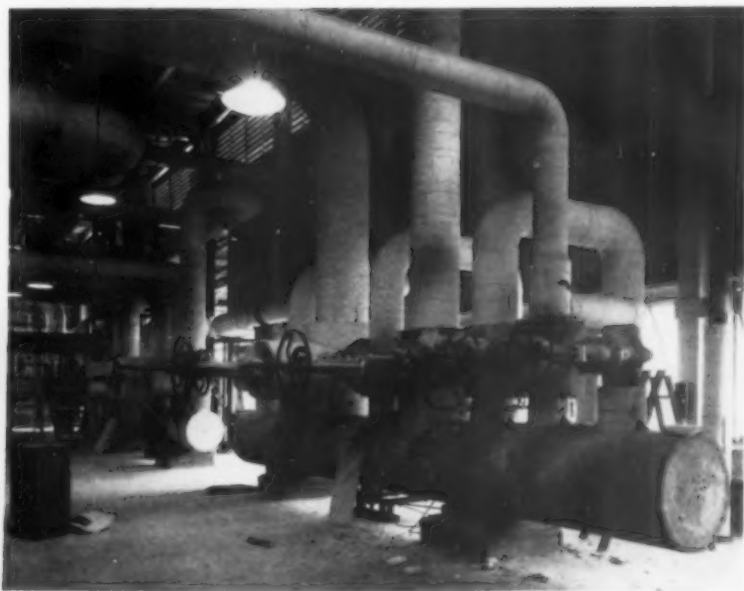
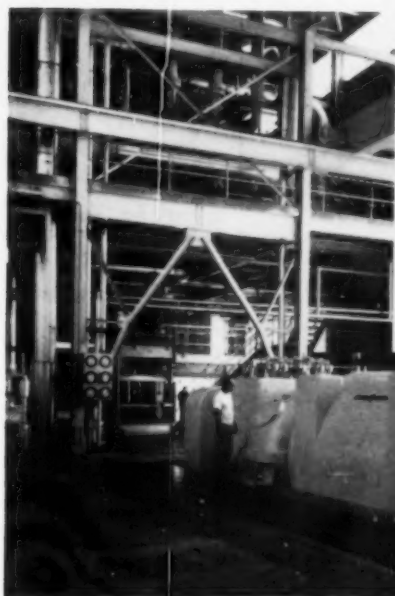
The forced draft fan delivers 100,000 cfm of air at 13 inches water pressure. It is driven by a 250 hp, 1200 rpm induction motor. A 50 psig steam air heater raises the temperature of the air supply to 300 F. The 300 F gas from the cyclone evaporator is handled by means of a double-inlet induced draft fan with a capacity of 193,000 cfm of gas at 13 inches water suction pressure when driven through a hydraulic coupling by means of a 600 hp, 720 rpm induction motor.

Pulp dryer converts wet fiber into sheets. Fibers are locked together on revolving vacuum drum as water is removed. More moisture is removed by pressure. The sheet is floated through the dryer on hot air provided by 120 fans. This dryer is the first of its type to be placed in operation in North America.



Right—50-lb Steam Headers.

Below — Electricity and steam requirements are provided by a mill power plant. Electricity is generated by the 12,500 kilowatt turbine generator shown here



The boiler passages are cleaned by automatic sequential, steam blowing, air motor driven soot blowers supplemented by steam hand lances where required.

Two 2200 gpm black liquor pumps recirculate the heavy black liquor to spray nozzles at the top of the cyclone evaporator. Weak black liquor or water can be recirculated through the cyclone evaporator for protection of the electric precipitator when the boiler is fired with natural gas only.

The two boilers are served by a single 175 foot high by 12 foot diameter tapered, circular, reinforced concrete brick lined chimney.

Electric power used in the pulp mill is generated by one 12,500 kw, single automatic 150 psig extraction, condensing, 3600 rpm turbine generator designed for initial steam conditions of 850 psig, 900 F total temperature and two and one-half inches Hg. abs. back pressure. The generator capacity is 15,625 kva, 0.80 power factor,

13,800 volts, 3 phase, 60 cycles and air-cooled.

The generator and exciter are protected against fire by means of an automatic carbon dioxide fire extinguishing system. The turbine generator is supported by a reinforced concrete foundation.

Steam from the turbine exhaust is condensed in a 9,000 square foot horizontal, two pass, radial flow, deaerating type surface condenser. All water to the pulp mill passes through the condenser. Two motor driven condensate pumps, one twin, two-stage steam jet air pump and a hogging jet serve as auxiliary equipment.

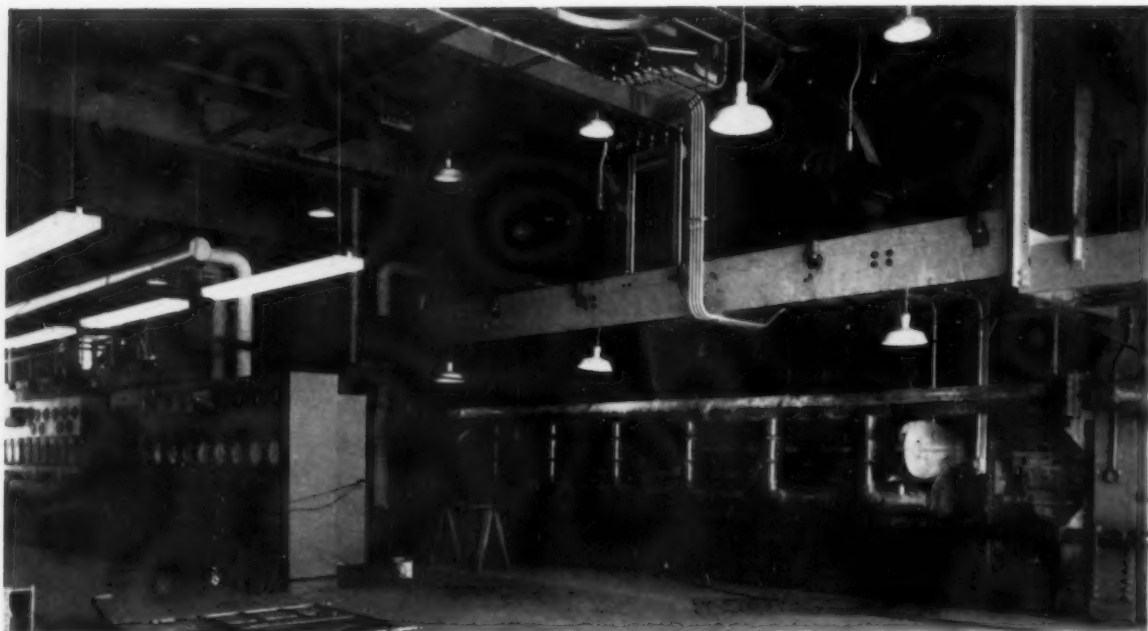
As a source of steam independent of the turbogenerator and also to supply 50 psig steam to mill processes, there are provided two pressure reducing and desuperheating stations. One unit reduces 850 psig steam to 150 psig steam and reduces the temperature from 900 F to 550 F. The other station reduces 150 psig, 550 F steam to 50 psig, 350 F.

The equipment operates in parallel with the automatic extraction turbine and also auxiliary steam turbine drives. All equipment is air operated and arranged for remote, manual and automatic control. The desuperheaters are spray type with steam atomization. The water is delivered by motor driven pumps with suctions connected to the condensate collecting tank.

Located on the main operating floor are three split casing, boiler feed pumps. Each has a capacity of 1200 gpm of 300 F water at a discharge pressure of 1235 psig. Two pumps are driven by steam turbines and one pump by a 1000 hp, 3600 rpm electric motor.

Demineralizing equipment is provided for the conditioning of make-up water. The system consists of three cation and three anion units packed with Invercarb resin and designed for outdoor installation. The units are arranged in battery and are equipped with fully automatic pushbutton control and a complete acid and caustic regenerating set.

Between the boilers, and serving all levels, is an elevator with a speed of 100 feet per minute. The turbine room is equipped with a 25 ton, hand operated bridge crane. With the exception of the demineralizer panel, all control panels are located on the main operating



Operating floor of power plant showing combination boiler.

floor. All power plant offices are located on the main operating floor near the turbine and boiler areas.

Air Compressors

The pulp mill air compressor is located in the power plant. This compressor is a two stage, duplex, double acting horizontal unit directly connected to a 300 hp synchronous motor. The capacity is 1611 cfm free air compressed to 110 psi.

About 310 cfm of free air compressed to 100 psi is needed for control of automatic devices. This is supplied by an additional compressor which is of the horizontal, single stage, double acting, carbon-ring type and is belt driven by a 75 hp, 1800 rpm induction motor.

The control air is dried by means of an electrodryer unit with full automatic controls, electric reactivation and operates on 3 hour absorber reversal cycles.

Recovery

The black liquor evaporators are located outdoors with bodies arranged in the shape of a "U." The unit is a backward feed, six body, sextuple effect, long tube, vertical film type, self supporting and equipped with a surface condenser and external separators. The unit is designed to concentrate 428,000

lb per hour of kraft black liquor from 14 per cent to 50 per cent total solids when supplied with 56,000 lb per hour of 45 psig steam. The expected rate of evaporation is 5.52 lb water per lb of steam.

The causticizing plant consists of the following conventional systems: green liquor clarification, dregs washing, lime slaking, white liquor clarification, and lime mud washing. The design capacity is approximately 43,000 cubic feet of white liquor per day.

The lime mud washer and the white liquor clarifier are the multiple tray type; the green liquor clarifier and dregs washer are of the single tray type. The clarifiers and wash tanks have been installed in line with the pumps arranged along one side to permit future clarifiers and tanks to parallel existing equipment. The system is so arranged that spare pumps would be available for existing or future systems.

Water Supply

The raw water for the plant is obtained from the Catawba River. Three vertical, submerged type raw water pumps have been installed with space provided for two future pumps. These pumps have a capacity of 5000 gpm each.

The raw water is pumped through approximately 4,500 feet of 30 inch diameter steel pipe to the water treating plant. This line has been coated and equipped for cathodic protection to insure longer service.

The water treating plant is a modern gravity type filtration plant which utilizes flash mixing, mechanical flocculation, settling and rapid sand filters. The rated capacity of the plant is 18 million gallons per day. Water flows by gravity from the treating plant to a 3 million gallon reservoir which is circular in shape and has been constructed of reinforced concrete. The lower portion of the reservoir is reserved for plant fire protection.

Water is pumped to the plant by mill service pumps which have been located adjacent to the storage reservoir. Three mill service pumps, each having a capacity of 9000 gpm, have been provided initially with provisions for future pumps. A 36 inch diameter steel line carries the water to the plant from the mill service pumps.

Waste Disposal

Sewers are provided for the collection of process waste material. Each system is equipped with manholes for convenient access

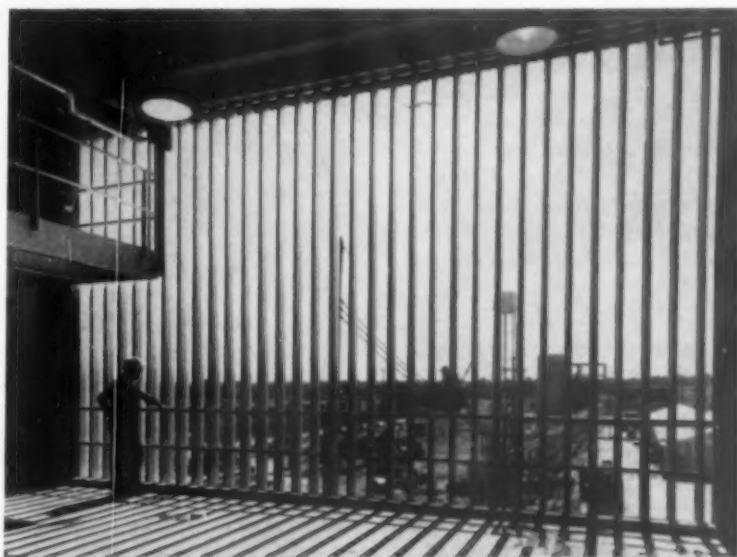
and maintenance. Parshall flumes are provided in each system to accurately meter the amount of waste.

The waste systems come together in the plant waste canal and flow toward the sedimentation basins. Two sedimentation basins of approximately 390 acre-feet each are provided. Waste flowing toward the basins passes through a diversion structure which will divert the flow toward the basin in use thus making it possible to clean one basin at a time.

From the diversion structure waste may flow either right or left along a concrete ditch which discharges the flow across a continuous 460 foot long weir plate. Waste flowing over their weir plate must then flow over a rough concrete apron for a distance of approximately 50 feet before entering the sedimentation basin. The rough concrete apron is provided to obtain maximum aeration of the waste material.

At the discharge end of the sedimentation basins the waste must flow across an additional weir which is 750 feet in length, across a concrete apron in a concrete lined ditch leading to the stabilization basin. Waste entering the stabilization basin is aerated further as it passes over a weir and flows down a rough concrete apron into the basin. This final weir and spillway apron are 720 feet in length.

The stabilization basin is approximately 5,700 acre-feet in size and is separated from the Catawba River by a large dike. Effluent



Acclaimed the most modern pulp mill in the world, entire walls in the power plant of Bowaters Carolina Corporation may be opened, Venetian blind fashion, to admit ventilating breezes while excluding sunlight. Through the slatted walls, above, a Bowaters employee views construction of another mill which this year will begin manufacture of hardboard.

entering the river must flow through an outlet structure.

In order to accurately proportion the amount of effluent entering the river, a 48 inch diameter magnetic flow meter with motor control valves at either end has been provided. The position of the valves and magnetic flow meter reading are recorded at all times by instruments which have been located in the power plant. Effectiveness of the pollution control is checked by conductivity meters.

Effluent from the outlet structure enters the river through a diffusion line along the bed of the stream. This line is approximately 385 feet in length and is equipped with 34 eight inch diameter nozzles with flap valves to provide equal distribution of the effluent across the stream.

Piping and Instruments

Carbon steel pipe is used throughout the digester, washing, screening, and recovery areas; also for feedwater and condensate service. Stainless steel pipe is used for hot caustic service, along with black steel in the causticizing and lime reburning area. Plastic lined steel pipe is provided for bleach liquor service.

For the chlorination stage of the bleach plant polyester impregnated fiberglass and rubber lined pipe has been installed. Stainless steel pipe has been provided for the hypochlorite and caustic stages of the bleach plant, as well as for stock and white water service in the pulp dryer area.

For throttling and shutoff service on stock and white water, stainless steel gate valves have

Instrument panels attended by power plant operator.



(Continued on page 69)

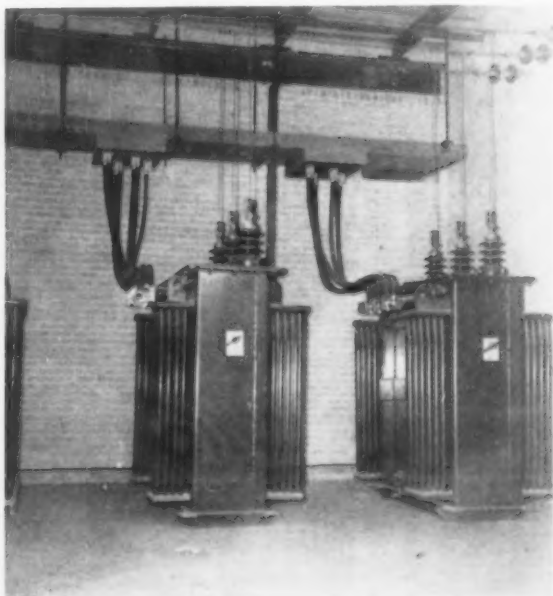
Electric Power, Air Conditioning, Lighting

The new 3¼-acre, million-dollar plant of Carolina Blouse Company has movable interior walls, noise-absorbent ceilings, and contains elaborate electrical distribution equipment.

CAROLINA BLOUSE CO., Greenville, S. C., operates a new 3¼-acre, million-dollar plant supplied by three 500 kva transformers completely housed in a transformer vault in the plant proper. This unusual arrangement is expected to extend life of the transformers and provide more convenient connections. Room was provided for three additional transformers for future expansion.

Power from the vault is transmitted through bus ducts to power panels of the latest design — with shunt switches on all three phases to prevent single phasing on sewing machines in case one phase gets dropped because of lightning or otherwise. Single phasing would blow fuses on 750 production machines, and a day would be lost replacing them.

Transformers are 500 kva, completely housed in the plant vault.



Secondary voltage is 480-277 volt, 3-phase, 4-wire, to permit delivery of desired voltage in any part of the plant.

Power supply to all departments of the plant is by bus duct overhead in the equipment rooms and dropped to Walker duct under the plant floor. Ducts are arranged to permit outlets on 12" centers throughout the production area.

All light fixtures in the plant have 277 volt ballasts to save on conductor size and for longer ballast life and lamp life. Eighty-watt, 8 ft fluorescent lamps are used in Wheeler fixtures.

Ten per cent uplight gives good light dispersion and 60 candle power is provided at work level.

All lighting is tied into a low voltage switching system which has five stations located at main entrances. Each station has a selector switch with nine positions to control all plant lights.

Two 250-hp Kewanee boilers are equipped with Iron Fireman oil burners arranged to convert to gas. Operating pressure is 90 pounds. Reducing stations at various plant locations control steam pressure to the desired level at point of use. This is an economy

Panels in boiler room are of latest type, conveniently located, well lighted, easily read.





Air conditioning equipment and heating are completely monitored by a supervisory data center. Harold Bridgeman, engineer, keeps tab.

SUPPLIERS OF PRINCIPAL EQUIPMENT

- Transformers**
General Electric Co.
- Boilers**
American Standard Industrial Division (Kewanee)
- Oil Burners**
Iron Fireman Mfg. Co.
- Bus Ducts**
Overhead—General Electric Co. with Federal Feed Rail for lighting fixtures)
- Floor Ducts**
Walker
- Motors and Controls**
General Electric Co.
- Air Conditioning System**
The Trane Co.
- Compressor**
The Trane Co.
- Conditioning Units**
The Trane Co.
- Control Panel**
Minneapolis-Honeywell Regulator Co.
- Lighting Fixtures**
Wheeler Fullerton Co.
- Cooling Tower**
Marley Co., Inc.
- Pumps and Fans**
Buffalo Forge Co.
- Office Dual-Duct Air Conditioning**
Buensod-Stacy, Inc.
- Materials Handling Equipment**
Engineered Products Co. and Cable Carrier Corp.
- Plumbing Fixtures**
American Standard Industrial Division

feature on line size.

A steam flow meter tells flow per hour throughout the plant, permitting economical boiler regulation. Oil flow and air mixture are controlled at the boilers by manually operated positioning switches which permit proper regulation. Electronic instruments convert boiler pressure readings for indication on the control panel.

The plant is completely air conditioned by 710 tons refrigeration capacity of centrifugal and recip-

rocating equipment supplied by Trane.

A separate high pressure dual-duct heating and air conditioning system supplies the office area, and electrostatic filters in this system are equipped with an automatic cleaner.

Air conditioning equipment and heating are completely monitored by a supervisory data center (control panel) supplied by Minneapolis-Honeywell. A ground system is used for lightning protection.

Right—Boilers of 250 hp each are equipped for gas conversion. They operate at 90 lb pressure and reducing stations are provided.

Below—Floor outlets are permitted on 12" centers throughout the production area.



Heat Pump

By **GEORGE H. WATSON**



View of the new home office building of Gulf Power Company, Pensacola, Fla.

FLEXIBILITY of control and operation is a feature of the heat pump installation in the new \$1,250,000 home office building of Gulf Power Company, Pensacola, Fla. The building itself is of unusual design, being a four-story solar-windowed structure, 185 by 200 feet in size. It is the nerve center for electrical power for a nine-county northwest Florida area.

Actually the air conditioning is divided into two major systems, one controlling the perimeter of the building and the other serves the interior area.

Two 100 horsepower built-up type heat pump systems, using outside air as their heat source,

deliver hot or chilled water to remotely located air conditioning units. Induction type units, located under each window around the perimeter, or outer walls of the building, both dehumidify and cool or heat the air being introduced into the work spaces.

The under-window units have coils supplied with either hot or chilled water from the heat pump over which preconditioned and dehumidified air from a central dehumidifier is blown. Each unit thus maintains comfort in the particular area served and has a thermostatic manually-controlled valve to provide for variations required for employee comfort in each area.

For further flexibility the perim-

eter system is divided into four zones or areas, east, west, north and south. In certain seasons of the year and at various times during the day, one side of the building may require less cooling or heating than another. The zone pumps allow the temperature and humidity to be maintained at comfort levels regardless of outside conditions.

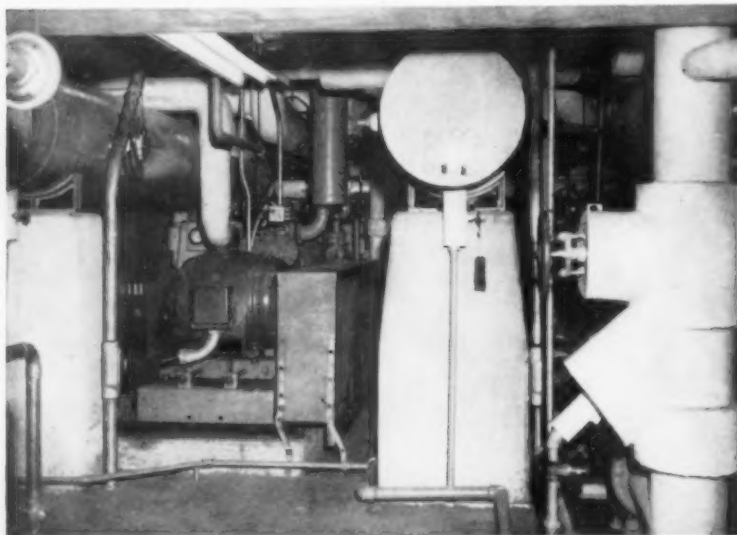
Separate air conditioning units are provided for areas which have more than normal occupancy, such as the appliance sales room and the demonstration kitchen. These operate independently. For some interior areas of the building which require no winter heating, a 75 horsepower conventional type refrigeration system provides summer air conditioning.

The air conditioning installation is entirely automatic and changes itself from summer to winter operation without the aid of human hands. The control system is designed to maintain both temperature and humidity in all areas of the building at desirable levels.

Located in the basement is a control and data collecting center, so that the building superintendent can determine at any minute the temperature and humidity at various locations throughout the building.

Electrical demands of the building are served from two 12,500 volt feeders which are terminated in underground transformer vaults just outside the rear wall of the building. Completely submersible, three phase transformers (one in

View showing some of heat pump air conditioning equipment.



each vault) step down the voltage to 277 and 480 volts as contrasted to the normal 120-208 volt systems, and serve the major air conditioning machinery and lighting loads. Individual 227-480 volt feeders are then run to each floor where distribution panelboards are located.

Gulf Power Company is a unit of the Southern Company system which serves Georgia, Alabama and part of Louisiana through other subsidiary companies. In the past 10 years customers served by Gulf Power Company have increased from 40,000 to 88,000 and

kilowatt hour sales of electricity are up 556 per cent.

James A. Evans Engineering Company, Birmingham, Ala., designed the air conditioning system and the installation was by Hardy

Corporation, Birmingham. Kenneth Fulghum of Pensacola was the general contractor and R. N. Pyle, Pensacola, was the mechanical contractor.

PRINCIPAL EQUIPMENT

Compressors	Worthington Corporation
Water Chillers	Acme Industries
Air Coils	Aerofin Corp.
Perimeter Units	American Blower Co.
Air Conditioning Units	American Blower Co.
Pumps	Chicago Pump Co.
Air Filters	American Air Filter Co.

Oklahoma City Company Reports on Benefits of

Smooth Fiberglass Skylights

THE SUPERSMOOTH surface of translucent fiberglass skylights has been credited as a major contributor to enduring, even light distribution and resultant increased production and a reduced accident rate by an Oklahoma plant official.

The benefits were achieved by the W&W Steel Company, Oklahoma City, following installation of 23,800 square feet of smooth-finished fiberglass reinforced plastic skylights in a 44,000-square-foot addition to the main plant.

"The material creates a uniformity of light distribution that could not be obtained by any com-

parable panel at reasonable cost," reports Allen E. Coles, W&W's executive vice-president. And one of the reasons for this better light diffusion is that the panel's smooth surface won't permit dirt to accumulate in microscopic crevices.

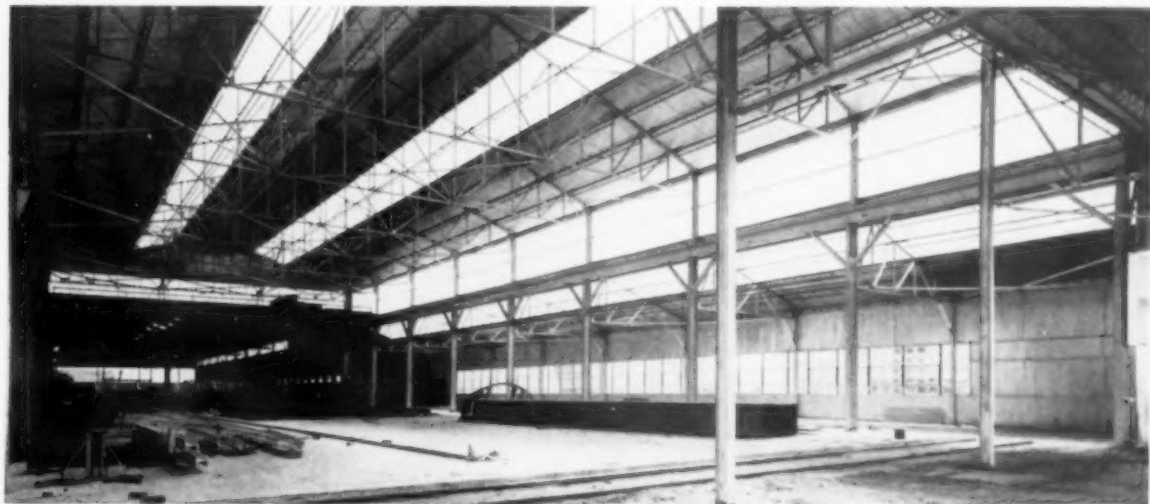
Mr. Coles explains that W&W installed fiberglass skylights in the 175,000-square-foot main plant some years ago, but that such early benefits as their shatterproof qualities and ability to softly and evenly diffuse light were partially dissipated by dirt and dust which adhered to the rough textured material originally purchased.

In the new addition W&W used

smooth-finished, 2½-inch corrugated jade green fiberglass, manufactured by Filon Plastics Corporation, and Mr. Coles points out that wind and rain act to constantly wash the panels.

Mr. Coles says the company plans a further 48,000-square-foot plant expansion and will again use smooth-surfaced fiberglass skylighting.

The advantage of smooth-finished material, particularly in skylighting and sidelighting industrial plants where maintenance must be kept at an absolute minimum, can now be observed on installations that have been up for several years. Even distribution of available daylight is the key feature of these installations, and this light diffusion must remain constant over the years. The smooth finished panels best achieve this objective, according to Filon officials.



uum which creates additional sources of possible air leakage into the system.

Partially Closed System

With the partially closed system, (Fig. 3) using an open deaerator as one of the stage heaters, the deaerator is placed in such a position in most systems as to be under positive pressure, thus eliminating the possibility of leakage around float level controllers, valves or connections.

At low load on the turbine where the bleed steam pressure to the deaerator might fall below atmospheric pressure, most units are arranged to admit steam through a pressure reducing valve from the next higher pressure bleed point, so that the deaerator is always under positive operating pressure.

In accordance with the Heat Exchange Institute Standards, an open deaerator (Fig. 4) in the system is guaranteed to remove from the water dissolved oxygen in excess of .005 cc per liter. Also, an open deaerator is usually guaranteed to reduce the titratable free CO₂ to zero thus preventing low pH.

Tests conducted on a spray reboiler type deaerator have dem-

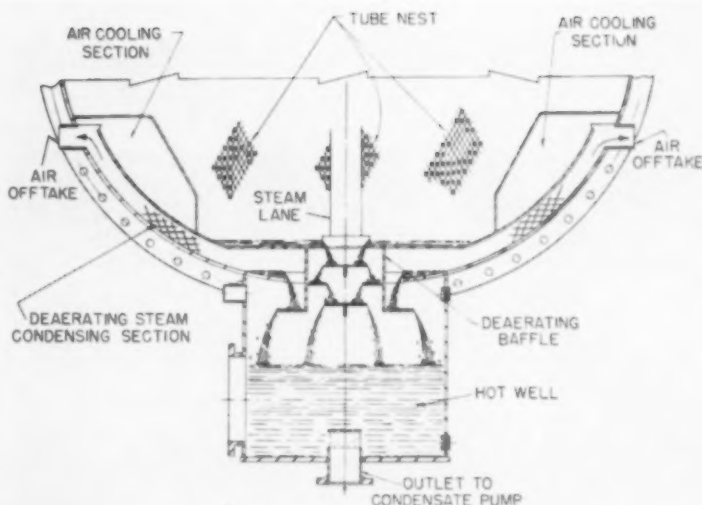


Figure 2—Typical Deaerating Type Condenser Hotwell

onstrated this guaranteed performance at flow rates from as low as 2% of rating up to rated capacity, and such efficiency is of particular interest in a power plant cycle where turbine loads do vary over a wide range, and where a plant operates at exceedingly low rates during start-up.

Table 1 lists oxygen residuals in the feedwater effluent from a Per-

mutit spray reboiler type direct contact deaerator and compares these results with residuals in the effluent from condenser deaerating hotwells.

Other advantages of an open deaerator in the system acting as a stage heater are as follows:

1. An open deaerator provides for a large supply of deaerated water in the storage section which is readily available for gravity flow to the suction of the boiler feed pump.

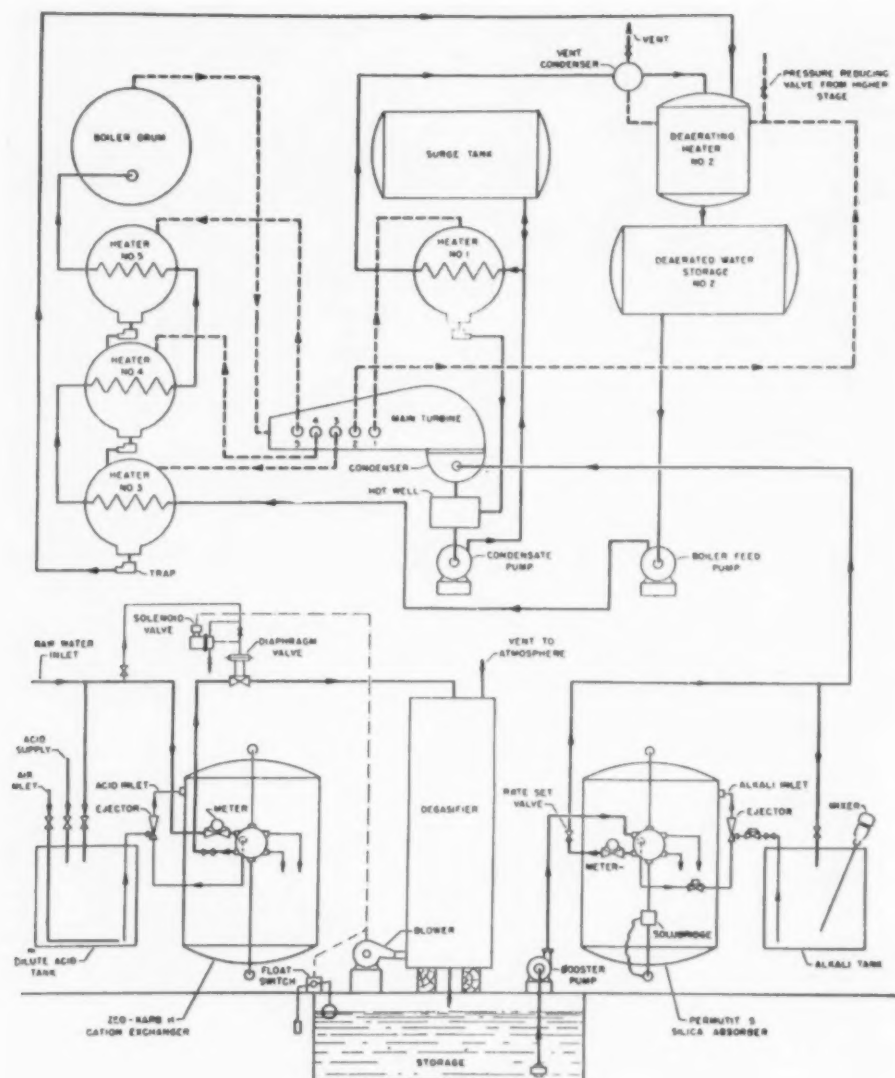
2. An open deaerator provides a receiver for heater drips and drains which are then deaerated. Also, this provides for increased thermal efficiency as compared to a closed system where closed heater drips are cascaded back to lower pressure heaters or to the condenser.

3. An open deaerator can receive several influent water streams at varying temperatures and quantities without affecting the oxygen residual in the effluent, whereas the total water introduced into a surface condenser shell at a temperature lower than the inlet steam temperature is limited to not more than 5% of the steam being condensed.

4. An open deaerator performing as a stage heater heats the feedwater up to steam temperature as compared to approximately 5 degree terminal difference with a closed heater in the system. Thus,

Table 1—Comparison of Oxygen Residuals

CONDENSER HOTWELL				DEAERATOR					
INSTALLATION	CAPACITY MW	O ₂ ML/L	TEMP °F	INSTALLATION	CAPACITY LB/HR	O ₂ ML/L	TEMP °F		
PLANT "A" (90MW) COND MFG-X TEST-22 HRS.	90MW	.000 .002	101°	PLANT "1" (950,000 LB/HR) DEA. MFG-A TEST-7 DAYS	1,014,000	.0027	300°		
	65 MW	.011 .011	92°		760,000	.0010	280°		
		540,000			.0009	270°			
	45 MW	.011 .018 .016	85°		250,000	.0005	255°		
PLANT "B" (100MW) COND MFG-Y TEST-27 HRS.	120MW	.018 .015 .013	—	PLANT "2" (350,000 LB/HR) DEA MFG-A TEST-2 DAYS	380,000	.0007 .0024 .0024	260°		
		90MW			.009 .010 .012	—	308,000	.0030 .0036 .0030	260°
					60MW		.009 .010 .012	—	230,000
	30 MW		.008 .007 .013				—		PLANT "3" (220,000 LB/HR) DEA MFG-A TEST-6 DAYS
		15 MW	.015 .010 .008	—	175,000	.0023		256°	
			130,000		.0007	252°			
	PLANT "C" (100 MW) COND. MFG-Y TEST-3 DAYS	114 MW	.0058	—	60,000	.0013	240°		
		60 MW	.0022 .0015	—	6,600	.0005	218°		
			40MW		.0056 .0028	—	Data contributed by E. B. Kuhn of the Elliott Company, and W. B. Bow of Foster Wheeler Corporation.		
20 MW		.0071 .0053							



the overall thermal efficiency of the system is increased by elimination of this terminal difference.

5. An open deaerator provides a means for removing oxygen and carbon dioxide from the vapor of the evaporator where an evaporator is used in the system.

The influent water to an evaporator should be and generally is deaerated to remove oxygen. However, due to alkalinity breakdown the evaporator vapor will contain carbon dioxide proportional to the alkalinity contained in the influent water.

In a closed system this vapor is fed into one of the closed heaters or evaporator condenser and the condensed steam is returned to the

system. This results in a higher CO_2 content of the feedwater, a decrease in pH, and a possible increase in iron and copper pick-up.

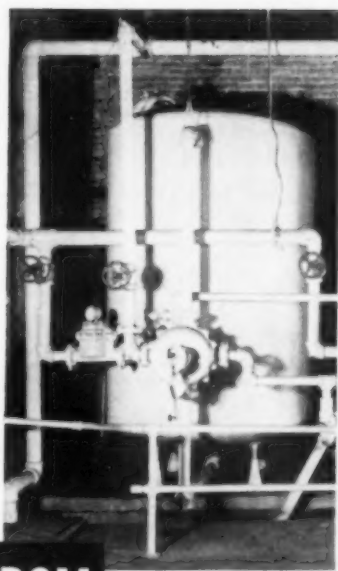
The importance of preceding an evaporator with an open deaerator is well illustrated by test results at a public utility (Table II) where the main deaerator (spray reboiler type) was supplied with steam from a make-up evaporator supplemented by extraction steam from the turbine. The evaporator was fed with undeaerated water so that the vapor from the evaporator was contaminated with oxygen.

These tests clearly demonstrated the high efficiency of the main de-aerator for removing oxygen from the feedwater, particularly when

all steam was taken from an extraction stage of the turbine. They also illustrate that when the oxygen-contaminated steam for the evaporator was used in the deaerator, the oxygen removal from the feedwater was not quite as effective.

A disadvantage often advanced against incorporating an open direct contact deaerator in a system is that it requires placing the unit high above the boiler feed pump to allow the necessary suction head, otherwise seizure of the boiler feed pump may occur as a result of flashing caused by sudden pressure loss in the deaerator. Anti-flash baffling is incorporated in the present day deaerator design to help reduce this objection of flashing.

Elgin makes it !



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a simple zeolite
water softener



TO

a complex
automatic deionizer

-and anything else in between

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Exactly the right thing! . . . the kind of equipment and installation that will give you maximum results at lowest cost . . . the kind of set-up that can only be assured by more than 50 years of intensive specialization in the difficult field of water conditioning.

Yes, a difficult field; a field with too many complexities, too many pitfalls, for the "Johnny-come-

lately". And this is just as true of the simplest equipment as of the most complex. The equipment may be simple, but anyone who knows the water conditioning field will tell you that the knowledge going into it is far from simple.

The Elgin installations above are poles apart—in form, in purpose, in cost. But they have one thing in common: Thanks to Elgin know-how, they are the best of their kind. And so is "everything in between" when it's Elgin!

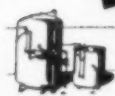


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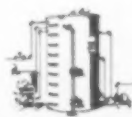
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DEAERATING HEATERS

Fig. 4—Open Direct Contact Deaerator

With anti-flash baffling, the cooler water discharging from the scrubber section during a sudden pressure drop in the deaerator is by-passed through the storage compartment directly to the pump suction, thus minimizing any flashing of deaerated storage water extending to the suction line and pump.

Even with anti-flash baffling, caution still prompts designers to provide the full suction head on the pump as insurance against such a boiler feed pump failure. A few plants now use a low head booster pump following the deaerator which supplies the necessary head for pumping the water into the suction of the main boiler feed pump and permits the use of short deaerator supports.

Completely Open System

The completely open system which employs all direct contact heaters is used to a far lesser degree than the first two systems. This system generally incorporates open non-deaerating direct contact heaters as stage heaters plus one open direct contact deaerator. With this arrangement, the water is heated to within one to two degrees of steam temperature in the open non-deaerating heaters and to exactly steam temperature in the open deaerator, which represents a substantial thermal gain. This often outweighs the disadvantages of additional pumping requirements at the outlet of each heater.

A partially closed system requires a feedwater pump at the open deaerator outlet plus high deaerator tank supports to provide the required suction head on this pump. A completely closed system using all closed tubular heaters would not require this additional pump or supports, but would normally require a separate storage tank, additional controls plus a deaerating type of condenser hotwell which would not be necessary with the partially closed system. Therefore, the difference in material costs of the two systems is probably insignificant.

It is safe to say that the serious-

ness of corrosion in boilers and pre-boiler circuits warrant adoption of the best control methods available. Since dissolved O_2 and free CO_2 in the feedwater are the biggest offenders, complete removal of these gases is mandatory.

Emphasis has been placed on the advantages of employing an open direct contact deaerator in central station feedwater systems so as to give the most complete removal of oxygen and free CO_2 , and also provide insurance for removal of any gases admitted to the feedwater through air leakage or contained in heater drips.

Such provision will afford protection against attack of equipment beyond the deaerator, but the equipment between a standard surface condenser and the deaerator may be subjected to attack. Consequently, many plants employ surface condenser hotwell deaeration in addition to an open direct contact deaerator as a stage heater.

These safeguards allow maximum protection throughout the feedwater circuit and, at the same time, tend to reduce the need for chemical additives, such as oxygen scavengers.

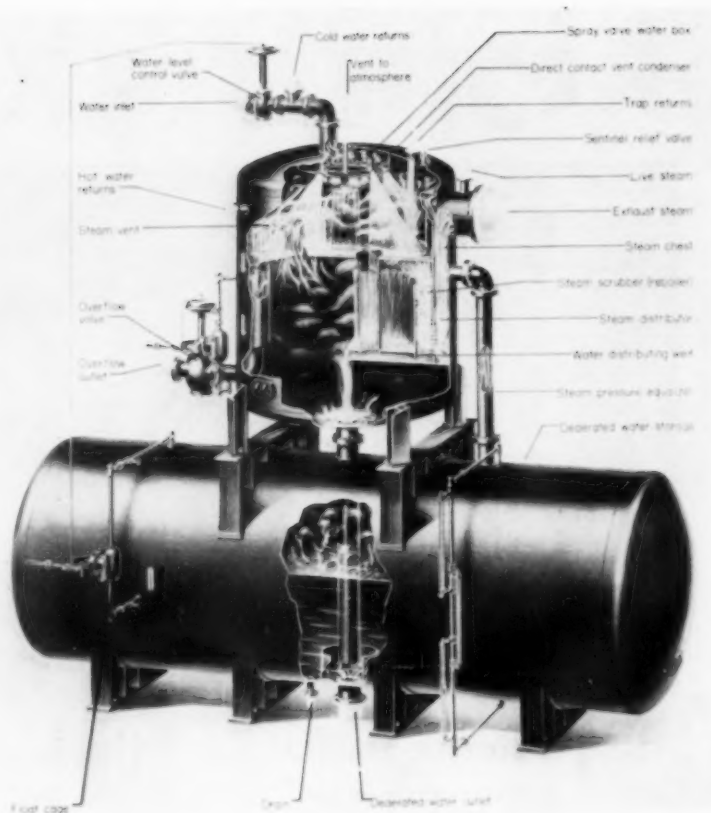
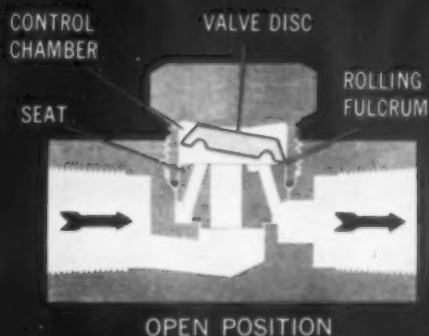
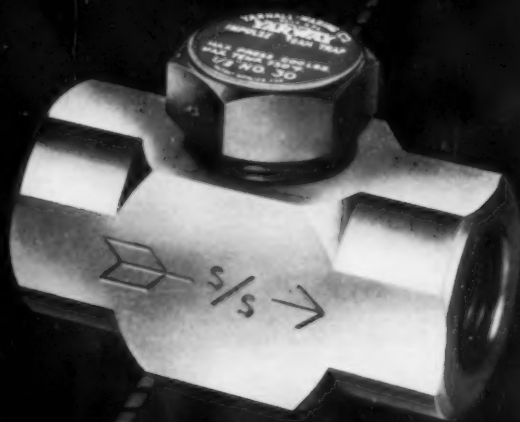


Table II—Oxygen in Deaerator Effluent

Turbine load megawatts	Evaporator off ml per liter	Evaporator on ml per liter	Steam from evaporator per cent
15	0.0005	—	—
20	0.0000	0.0064	20.2
40	0.0009	0.0027	56.0
60	0.0010	0.0012	46.4
80	0.0027	0.0039	34.5

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2. Longer service life?

Yarway's lever action reduces impact on valve seat—lessens wear, gives longer operating life. Quieter operation, too!

3. Lower maintenance?

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Standing beside the new 6000 kw silicon converter, installed at Alcoa's Badin, N. C. works, is Robert N. Wagner, chief electrical engineer for Aluminum Company of America.



One of Alcoa's 6825 kw rotary converters, installed in 1918, at the same plant is shown at right. The 312 silicon rectifier cells piled in the foreground are sufficient to build a 6000 kw static converter like the one at left.

Alcoa's Badin, North Carolina Plant Modernizes D-C Supply

Most Powerful Silicon Rectifier

A THREE-YEAR joint development by Westinghouse Electric Corporation and Aluminum Company of America is a compact ac-to-dc rectifier that can produce up to four per cent more primary aluminum per kilowatt-hour.

Rated 10,000 amperes at 600 volts, the unit has greater current-carrying capability and higher efficiency than any previous large silicon rectifying equipment. It delivers 6,000 kilowatts of power from only 312 silicon rectifier cells — considerably more power per cell than ever before obtained in large silicon rectifiers.

By using high-efficiency rectifying devices (thus eliminating the need for elaborate apparatus to discharge heat generated by ac-to-dc conversion) with a corresponding reduction in the number of devices needed to build the new converter, Westinghouse was able to

contain the equipment in an aluminum cubicle nine feet wide by five feet deep by ten feet high.

The unit requires about one-third the floor space of other types of rectifying equipment having a similar rating, and it is comparable in physical size to previous silicon rectifying equipment having only half the output. The over-all efficiency of the new equipment exceeds 97 per cent.

Alcoa Vice-President B. J. Fletcher cited the new development as promising major advantages to the electrochemical industry of the United States. "The result of this joint Alcoa-Westinghouse project," he said, "offers greater output per kilowatt for aluminum smelting and various other electrochemical operations throughout industry. It means more effective use of electrical energy."

A. C. Monteith, Westinghouse

vice-president and general manager of apparatus products said, "Silicon rectifier cells have the inherent advantages of static devices, with high efficiency and compact size. These attributes have made other types of conversion equipment obsolete for many applications in the past three years. At the present rate of acceptance, silicon rectifiers will become the dominant direct-current supply for all of industry by 1963."

The 10,000-amp rectifier unit has been installed at Alcoa's Badin, North Carolina smelter, where it is supplying power for the aluminum smelting process. A prototype 5000-amp silicon converter built by Westinghouse has been successfully operated at Badin since early 1958.

The new unit represents the most comprehensive use of aluminum to date in the construction of large rectifiers. Approximately 60 per cent of the entire weight of the assembled unit is Alcoa aluminum.

Trapping Standardization

... steam trap standardization plus standardized hook-ups spell lower maintenance costs

An important weapon in the fight against rising maintenance costs is standardization. It can reduce the variety of maintenance problems and simplify those which remain.

Since we specialize in steam traps we'd like to offer some suggestions for a trapping standardization program. Such a program involves standardization on one make of trap and standardization of hook-ups.

Trap Standardization

The advantages of standardizing on a single make of trap are important and can make a big difference in the cost and ease of repairs because—

1. You can carry a more complete stock of repair parts with a smaller inventory.
2. Maintenance personnel has the opportunity to become expert on one make rather than be "jacks of all traps."
3. As an exclusive user of one make of traps you become a preferred customer of your trap representative and can be sure of getting the best possible service.
4. You can enjoy the advantages of standardized hook-ups.

Standardized Hook-ups

Standardized hook-ups facilitate and reduce the cost of both original installation and maintenance. By adopting standards for the dimensions of all fittings, including nipples, each hook-up for a given size of trap is identical and can be fabricated in the pipe shop.

Unions should be used so that when a trap needs repair, the unions can be uncoupled, the trap lifted from the line and a spare carrying identical length nipples and half unions slipped into place. In as little as a minute or two a faulty trap can be replaced. The faulty trap can go back to the storeroom for repair when convenient and then be put into stock as a spare.

Figure 1 shows a typical standardized hook-up used by a major chemical manufacturer. Note how

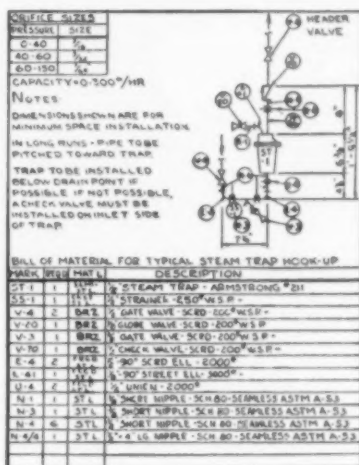


Fig. 1—Typical standardized installation hook-up used by a leading chemical manufacturer.

the hook-up provides the following advantages:

1. Test valve in trap cap permits fast, easy checking of trap operation.
2. Strainer ahead of trap protects it against dirt and scale.
3. Blowdown valve in strainer provides easy cleaning.
4. Check valve in discharge line isolates trap when test valve is opened.
5. Shut-off valves and unions



Fig. 2—Armstrong traps have only two moving parts—the lever assembly and the bucket. Nothing much to go wrong here.

ahead of and following trap permit removal of entire trap from line.

Another important consideration for getting the most from a standardization program is accessibility of the traps. Insofar as is possible, traps should be located so that they are convenient for inspection. The easier it is to locate and get at a trap, the less likelihood that it will be overlooked.

What Make of Trap? (This is the Commercial)

Obviously, a trap standardization program shows the best results when the make of trap selected is the one that gives the best service. Naturally, we think the make should be Armstrong and fortunately a lot of trap users agree. Here are some of the advantages of standardizing on Armstrong that have been pointed out by these users:

1. *Armstrong traps work.* They don't leak steam and they do discharge condensate and air as fast as they reach the trap. And they work with any return system.
2. *Armstrong traps aren't "prima donnas."* They need no special care or coddling. Valve and seat are hardened chrome steel. Lever assembly and bucket are stainless steel and these are the only moving parts.

3. *Armstrong traps aren't "orphans."* You can always get parts and service from nearby Factory Representatives and stocking distributors.

4. *Armstrong traps are guaranteed.* If you're not completely satisfied you can return the traps for refund of purchase price.

More Information

The 44-page Steam Trap Book (free on request) gives a lot more facts on trap selection and installation. Call your local Armstrong Representative or write **Armstrong Machine Works, 8062 Maple St., Three Rivers, Michigan.**



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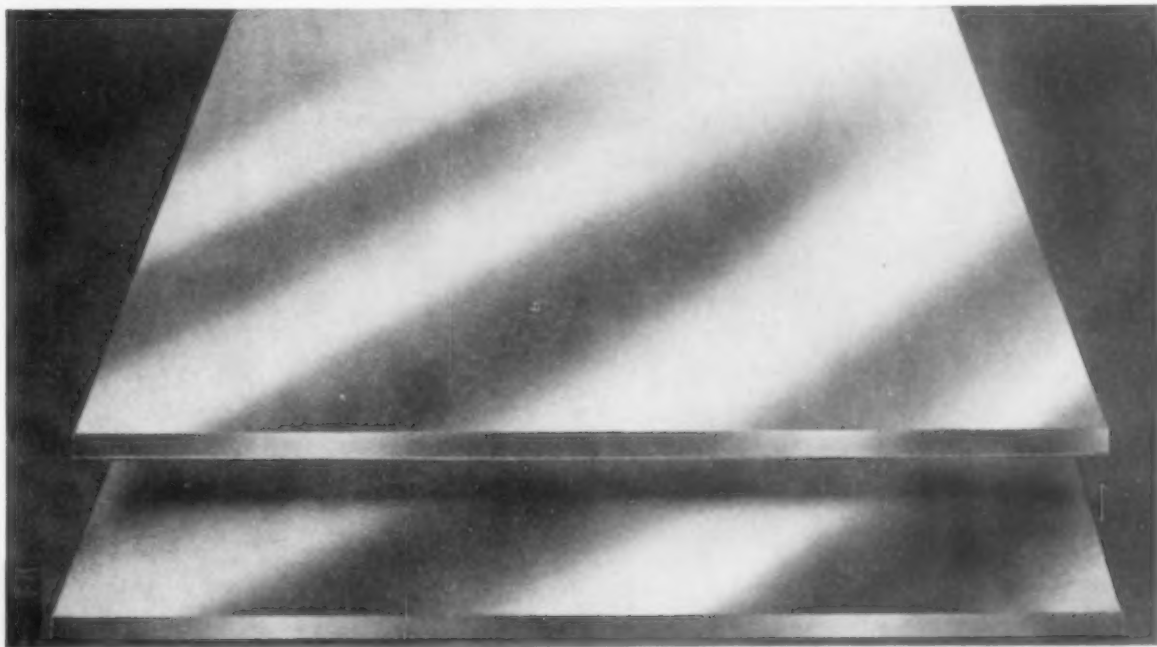
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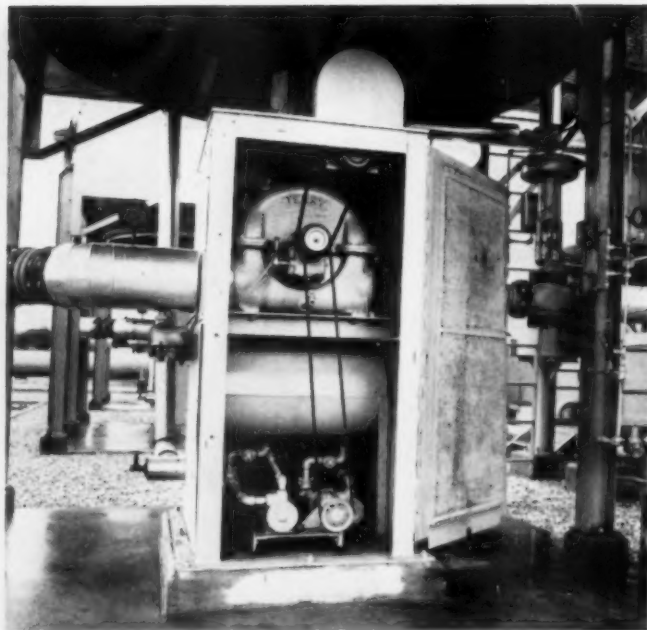
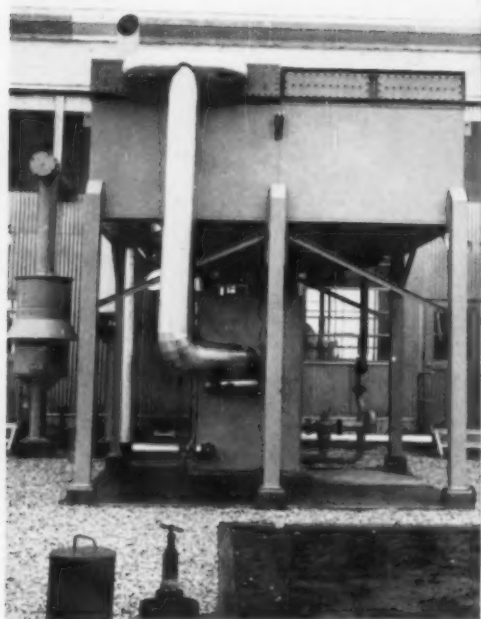
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Waste Heat Cools Engines

WHEN UNITED Gas Pipe Line

Company's new compressor station near Runge, Tex., went on line recently, it did so with something new — even revolutionary — in cooling systems. Each of its 880-hp units is equipped with a cooler selected after exhaustive tests and modifications on an experimental unit at another of the company's compressor plants.

Paradoxically, heat from the running engines is adapted to produce the very cooling agent which prevents their becoming overheated. This is accomplished simply by utilizing formerly wasted heat from the engine cooling system to generate steam. The steam in turn drives a low pressure turbine to drive the cooling fan.

At the experimental station, engines are cooled by the *vapor phase* thermal circulation system in which engine jacket cooling is with water, part of which is allowed to become steam at atmospheric pressure. *Vapor phase* simply means that jacket water may be in the form of water and steam as compared to older systems in which water or other

coolant is always liquid, and steam is not allowed to generate. At the experimental station a hydraulic drive system with power take-off from the compressor engine main shaft operates the cooling fan. But in 1956, one engine was adapted to generate steam of sufficient pressure to run a low pressure turbine for driving its cooling tower fan. Results were so satisfactory that the engineers decided to install turbine driven cooling equipment at the new station.

Steam generation for the turbine drive and simplification of water and oil pumping systems reduce first costs and at the same time increase the compressor engine output in direct proportion to the reduction of power required for pump and fan operation.

Supplying steam for the turbine makes it necessary to raise the cooling temperature which varies according to engine load and ambient temperature. In actual operation the minimum pressure at which the turbine is set to run is 5 pounds per square inch. Since steam pressure of 15 psig can be

obtained at 100 per cent load, the system will supply ample cooling at all loads.

In addition to the cooling fan, the steam turbine drives a small rotary pump which returns all condensate to the engine cooling system. An electric motor-driven pump is necessary only when the unit is put into service and the steam turbine is not operating.

Over the years, many progressive improvements in compressor stations have been made. Now another step has been taken in the interest of higher efficiency. This time — as is often the case — improvement was accomplished by harnessing a waste or by-product to do a job better than it was done before.

CORRECTION

The author has called attention to an error in the article "Stainless Steel Seawater Pump" that appeared on p. 60 of our Oct. issue. The pump speed is 3600 rpm instead of 600 rpm as stated in the article.



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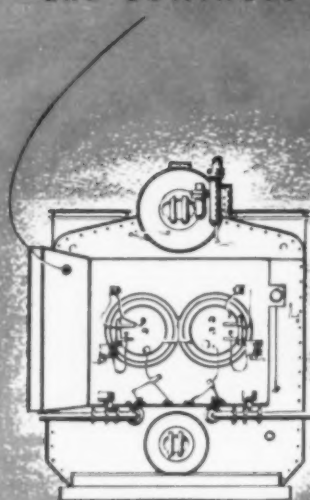
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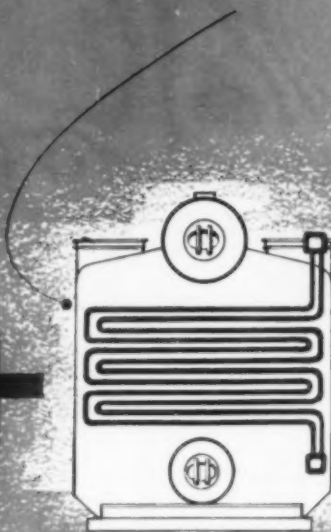
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ONE RESPONSIBILITY

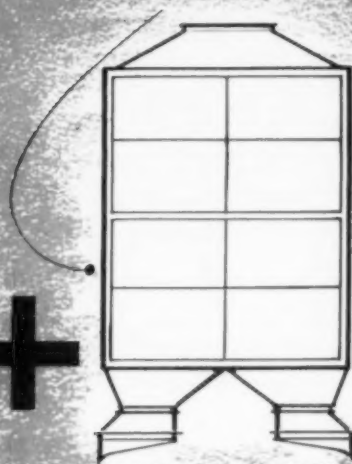
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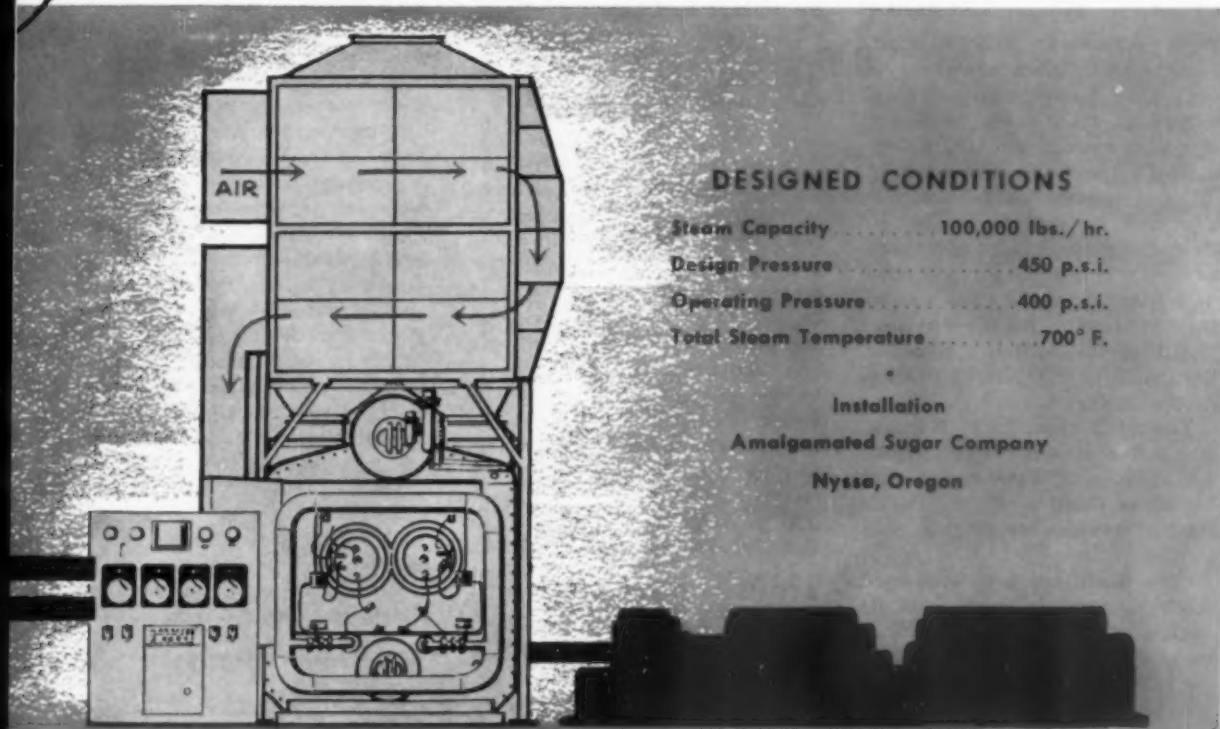


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- **Minimum of attention required for operation**
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Low first cost of this packaged installation saves considerable money over the cost of a similar field erected unit with no decrease in quality or efficiency.

If your problem is one of adding high pressure and high temperature steam for process work, power generation, or at low capital expenditure, to assist your present boilers during peak loads, then investigate Power Packages by Erie City Iron Works. Write for additional information in Bulletin SB-5904-D.

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News of the Atom

ATOMS IN SOUTH CAROLINA

THE SAVANNAH RIVER Plant has been commended for the part it has played, and continues to play, in maintaining the health of the Savannah River. Effectiveness of safety procedures followed by the Atomic Energy Commission and its contractor, the du Pont Company, in plant operations as they relate to the river is cited in a letter from the Chairman of the Savannah River Advisory Board to R. C. Blair, Manager, Savannah River Operations Office, Atomic Energy Commission.

The letter from L. F. Warrick, who is Technical Services Consultant, Division of Water Supply and Pollution Control, U. S. Public Health Service, Washington, said in part:

"The Board has been impressed throughout the entire time of its studies of the water conditions along the Savannah River, extending back to 1952 before your plant was placed in operation, with the cooperation extended by your organization. Our task of ascertaining the impact, if any, of the operations of your plant on stream conditions has been aided greatly by the information and assistance provided by you, members of your staff, and the staff of the operating contractor.

"It is encouraging to note from the results of the river studies to date that no conditions have been demonstrated that need give rise to concern as regards levels of radiation. These results are well within generally accepted tolerances for safety, and we have every reason to feel that measures that are being taken at the plant to avoid pollution are adequate to meet current needs."

The Savannah River Advisory Board was organized in 1951 to periodically assess the water quality of the Savannah River as a result of use of the water by industry and municipalities. The Board cooperates closely with the Atomic Energy Commission and other users of Savannah River water.

By **JOHN F. LEE**

**SPI Consultant on Atomics
Broughton Professor and Head
Mechanical Engineering Dept.
North Carolina State College**

The Board was named by the Surgeon General of the U. S. Public Health Service. It studies the condition of the Savannah River as influenced by industrial and municipal usage; is kept informed on various research and monitoring programs in connection with river water quality; and is kept informed on industrial projects designed to assure continued healthy conditions of the river. In addition to Chairman Warrick, there are eleven board members from various government agencies, state agencies and industrial companies.

ATOMS AND FORESTS

The 75 millionth pine seedling was set out at the Savannah River Plant in a special ceremony recently. Robert C. Blair, Manager, Savannah River Operations Office, Atomic Energy Commission, turned the dirt for the seedling in front of the Main Administration Building. A commemorative plaque was placed to mark the occasion. Officials from the U. S. Forest Service and forestry leaders from the States of South Carolina and Georgia were invited to the ceremony.

The planting of the special seedling highlights a Forest Management Program begun at the Savannah River Plant in 1952 under an agreement between the Atomic Energy Commission and the Forest Service of the U. S. Department of Agriculture. The Forest Service provides land management assistance in the program which has brought the establishment of new pine forests on some 67,300 acres of open land in the confines of the project. Planting of the open fields under the program is virtually complete. Plantings to date consist of 37 million Slash, 28 million Longleaf and 10 million Loblolly pine seedlings.

The objectives of the Forest

Management program are: Proper utilization of land which otherwise would be idle, control of erosion, control of dust, control of noxious weeds and grasses to reduce potential fire hazards, the provision of adequate ground cover to assist in maintaining the sub-surface water table, the improvement of existing timber stands through the removal of undesirable growth, advice and assistance in the maintenance of an adequate fire protection program, and the development of a timber management plan and sales program which will eventually return to the U. S. Government, as receipts from sales to the public, all costs relating to the program.

Costs to date approximate \$1,630,000. At the same time, Commission and Forest Service officials estimate that timber values on the plant site are increasing at a rate of about \$1,900,000 annually.

ATOMS IN NEW YORK

The Consolidated Edison Company, supplier of power to metropolitan New York and adjacent Westchester County, received in May, 1956, Power Reactor Construction Permit Number 1 from the Atomic Energy Commission to build a large scale commercial atomic energy power plant. Pioneering advances in producing and distributing electricity to nearly 9 million people living within its 600 square mile service area is not new to Con Edison.

Atomic energy for peaceful power generation is, however, one of the major and more dramatic advances, and one of more than just passing interest to the general public. The site selected by Con Edison is Indian Point, located on the Hudson River about 35 miles north of Times Square.

Costing close to \$100 million, Indian Point will have a total generating capacity of 275,000 kilowatts when operation begins early in 1961. The reactor will be of the pressurized water type using a mixture of 93 per cent enriched

(Continued on page 54)

How the boiler room of the Hudson Bay High School also serves the school across the street

And a neighborly boiler room it is! From it, 100,000 feet of USS National Pipe, in the form of steam heat, plumbing, air and fuel lines, serves not only the Hudson Bay High School, Vancouver, Washington, but is used to pipe steam across the street to a vocational school, too. USS National Pipe in sizes from 1/2-inch through 12 inches was used.

Do you need quality pipe for power, heating and air conditioning installations? You'll get it when you ask for USS National Steel Pipe. If you'd like further information, or immediate assistance with your pipe problems, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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The world's largest and most experienced manufacturer of tubular products.



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uranium oxide (UO_2) and thorium oxide (ThO_2) as fuel.

The UO_2 and ThO_2 fuel will be homogeneously mixed, formed into pellets, and placed in rod type fuel elements clad with stainless steel. These elements, when grouped together, form the core which is the heart of the reactor. Basic difference between this nuclear power plant and a conventional power plant lies in the type of fuel used to produce the heat that turns water to steam. From that point on, the two types of power generation are essentially the same.

Water under pressure flows through the core and is heated to 518 F. However, because of the pressure, the water does not boil. This feature is where the reactor gets its name, pressurized water type.

The 518 F water then flows to one of four heat exchangers, where the heat is transferred to water that is not under such high pressure, thus changing it to steam having a temperature of 449 F. Total heat output of the reactor equals 585 megawatts, which will

produce steam at the rate of 2,200,000 pounds per hour.

The steam at this temperature is capable of producing 163,000 kilowatts of electricity. However, before going to the steam turbines, it flows through an oil fired superheater, which raises the temperature to 1,000 F, and increases its capacity to produce electricity to 275,000 kilowatts.

Initially the atomic core will contain about 17,200 kilograms of thorium oxide and about 1,100 kilograms of uranium-235 oxide. During the estimated useful core life of 600 days, approximately 350 kilograms of thorium oxide and 405 kilograms of uranium oxide will be used, leaving 16,950 kg of ThO_2 and 695 kg of UO_2 , which can be processed for re-use. An additional 147 kg of fissionable U-233 will also be available for re-processing.

The active portion of the reactor core, which is the portion that actually contains active atomic fuel, resembles a circular cylinder 8-ft high and 6.5-ft. in diameter. It is housed in the reactor vessel that

resembles a cylinder measuring 11 ft. in diameter by 40 ft. high.

Weighing approximately 255 tons, the reactor vessel is designed to operate at a pressure as high as 1,800 pounds per square inch. Vitro Engineering is nuclear consultant for Indian Point, and Babcock & Wilcox is furnishing the nuclear reactor system. Westinghouse is building the 275,000 kw steam turbine. The UO_2 is being furnished by Mallinckrodt Nuclear from their Hematite, Mo., plant. It will be shipped to the B&W nuclear facilities plant in Lynchburg, Va., for fabrication into fuel elements and thence shipped to Indian Point for installation in the reactor.

Outstanding feature of the Indian Point atomic power plant is the 180-ft diameter concrete external radiation shield with self-supporting dome which surrounds the 160-ft diameter steel sphere that will house the nuclear "hardware." When complete, it will contain an atomic power plant far more technically advanced than

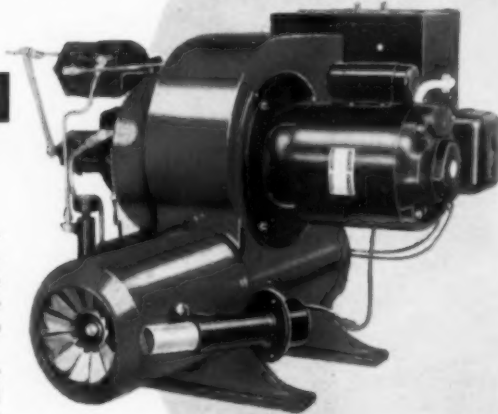
(Continued on page 56)

Keep heating costs low with HEV-E-OIL commercial-industrial burners

Hev-E-Oil burners furnish all the air necessary for combustion, assuring perfect fire control under all weather conditions. Low fire start that builds up gradually to the flame size required means smooth, safe operation. And once the burner is set for greatest efficiency, it stays that way no matter what the weather.

A complete package! Fire tested! Automatic, electronic controls. Meets all codes. Easy to install . . . Hev-E-Oil models from 5 to 150 gph. Also available, Hev-E-Duty power gas burners and combination gas/oil burners from 720,000 to 21,000,000 B.T.U.

For more information write Industrial Combustion, Inc. 4507 N. Oakland Ave., Milwaukee 11, Wis., Dept. SPI-4.

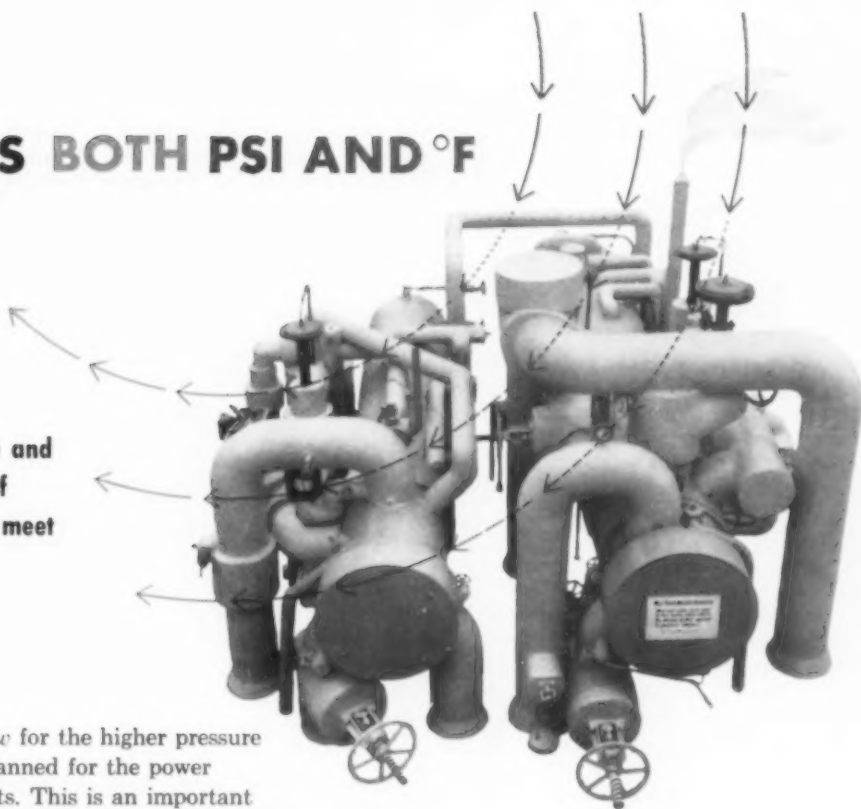


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YUBA LICKS BOTH PSI AND °F

Exclusive Multilok Closure and all-welded construction of Yuba Feedwater Heaters meet requirements of newer generating stations



Yuba has the products *now* for the higher pressure and temperature ranges planned for the power industry's new steam plants. This is an important reason why Yuba Feedwater Heaters are so widely specified throughout the industry today. Operating in the 4,000 PSI, 1,000 °F range now, Yuba Feedwater Heaters, incorporating the exclusive *Multilok Closure*, are suited for all future pressure and temperature developments.

Advanced engineering keeps Yuba ahead . . . the new *all-welded construction*, for example. Shells are welded to channels without flanges, eliminating possible leakage that can occur in other construction at high pressures and temperatures. For low and intermediate pressures, Yuba's bolted design is applicable.

When space is important, Yuba can combine several heaters—effectively designing two or more stages in a single shell. For all your needs, Yuba specialists will discuss with you in detail, the design, construction and advantages of Yuba's *years ahead* Feedwater Heaters.

Other Yuba products for steam power plants include Condensers, Evaporators, Expansion Joints, Heaters, Tanks, Cranes, Structural Steel and scores of other items.



specialists in power plant equipment

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originally planned. Yet Con Edison believes Indian Point is only a beginning, and that the knowledge and experience gained in its operation will contribute much towards making atomic energy a very practical and economical method of generating electricity.

ATOMS ACROSS THE SEAS

A discussion of the ways in which radioactive debris from nuclear tests is transported in the atmosphere, especially at high levels, was arranged by the World Meteorological Organization at the request of the United Nations Scientific Committee on the Effects of Atomic Radiation as part of the Committee's seventh session at UN Headquarters.

Twelve specialists from eight countries were invited by WMO to take part in the discussion, dealing with the observed distribution of radio-activity in the atmosphere at all levels; with the transport of this material by upper winds; with the ultimate disappearance of the material from the atmosphere as fallout, both in solid form and as brought down by rain; with the observed distribution of past fallout; and with methods of predicting future fallout from past tests.

The specialists included both meteorologists working directly on the world-wide fallout problem and experts with a broad background in the relevant phases of meteorology, such as the atmospheric processes connected with the transport of radioactive debris and with fallout. Scientists with different viewpoints were included.

The purpose of the discussion was to provide the UN Scientific Committee with meteorological information regarding the effects of atmospheric processes on fallout transport. The United Nations Scientific Committee on the Effects of Atomic Radiation was established by the General Assembly, to which it reports. It includes 15 member states represented by scientists in fields such as medicine, biology, and radiochemistry.

The specialists invited by the World Meteorological Organization participated in several of the closed meetings of the Committee.

Detailed information on 77 research, test and experimental reactors in 22 countries is given in

the second volume of a *Directory of Reactors* published by the International Atomic Energy Agency in Vienna. All the reactors described are either currently in operation or under construction. A third volume covering remaining research reactors will be issued in the middle of this year. The reactors have been grouped in six main categories:

Light water-moderated, pool type (20 reactors)

Light water-moderated, tank type (10 reactors)

Liquid homogeneous (19 reactors)

Solid homogeneous (9 reactors)

Heavy water-moderated (13 reactors)

Graphite-moderated (5 reactors)

Organic-moderated (1 reactor)

Full details are given for one representative reactor in each group and for those reactors having little similarity with any other. For the remaining reactors in each

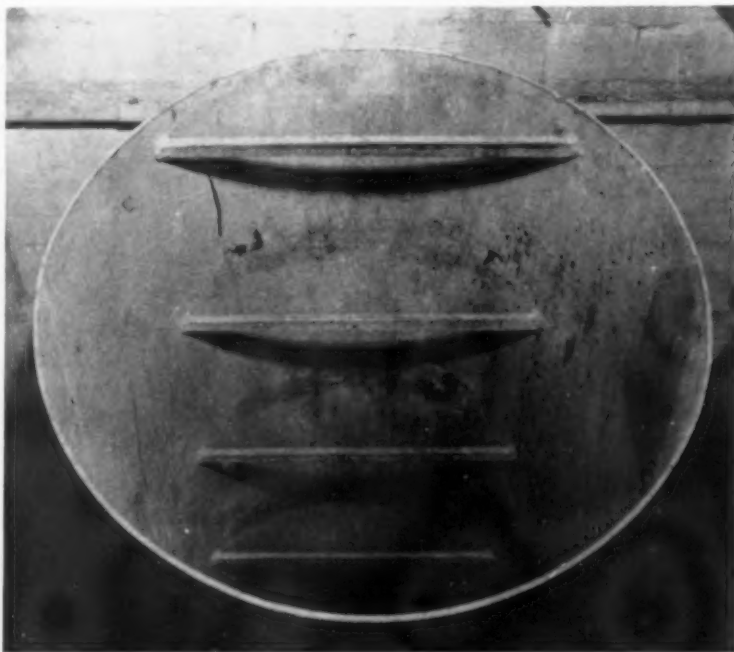
group general information and major modifications are presented. The detailed information includes physics data and data on the core and the fuel element, core heat transfer, control, reactor vessel, over-all dimensions, reflector and shielding, and cost estimate.

Sketches are provided of the fuel element or the fuel element assembly and of horizontal and vertical sections of the reactor. The reactors described are situated in the following countries: United States 37, United Kingdom 7, France 5, German Federal Republic 4, Canada 3, Belgium, Denmark, Italy and Sweden 2 each, and one each in Australia, Belgian Congo, Austria, Brazil, Greece, Iran, Israel, Republic of Korea, Norway, Portugal, Puerto Rico, Spain and Venezuela.

The directory, which is published in English only, is for sale through IAEA sales agents in various countries. Inquiries may be directed to IAEA, Vienna.

THREAT OF TIDE ZONE CORROSION

called for use of 4-D wrought iron for this 30-inch diameter vacuum breaker access tube at a municipal power plant on Florida's northeast coast. Fabricated from $\frac{1}{4}$ and 1-inch thick 4-D wrought iron plates by Bushnell Iron Works of Jacksonville, Fla., the tube extends nearly 9½ feet vertically from a grating floor to the top of a water well. Water for plant operations is drawn through a suction tube causing "tide zone" corrosive action. Ladder steps leading downward into the tube were fabricated from 4-D wrought iron bars.



MANAGEMENT CLINIC



Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Demand for Individual Employee Recognition

Question

IN A FEW MONTHS from now, our company will sit down with the Union to negotiate a new contract. According to unofficial but apparently well-founded information that has filtered to us, the Union package is going to include a demand for birthday holidays with full pay, for each member.

Since we have more than 500 Union members on our payrolls, we feel this demand is one we simply cannot meet, both from the substantial out-of-pocket expense, and from the loss in productive time.

Is there any way in which this kind of demand, if made by the Union, can be countered other than by a flat "no?"

Suggestions

A MUCH PRACTICED strategy of both war and boxing, is to "beat your opponent to the punch." Application of this strategy takes several forms, and here is one of them:

Make use of your "unofficial but well-founded" sources in reverse. Through them, let the word filter back, also "unofficial but well-founded," that the company cannot and will not, agree to birth anniversary holidays.

Since Union officials are intelligent, practical men, with no desire to push negotiations to a stalemate, there's a good chance of the point being postponed quietly until a more propitious year.

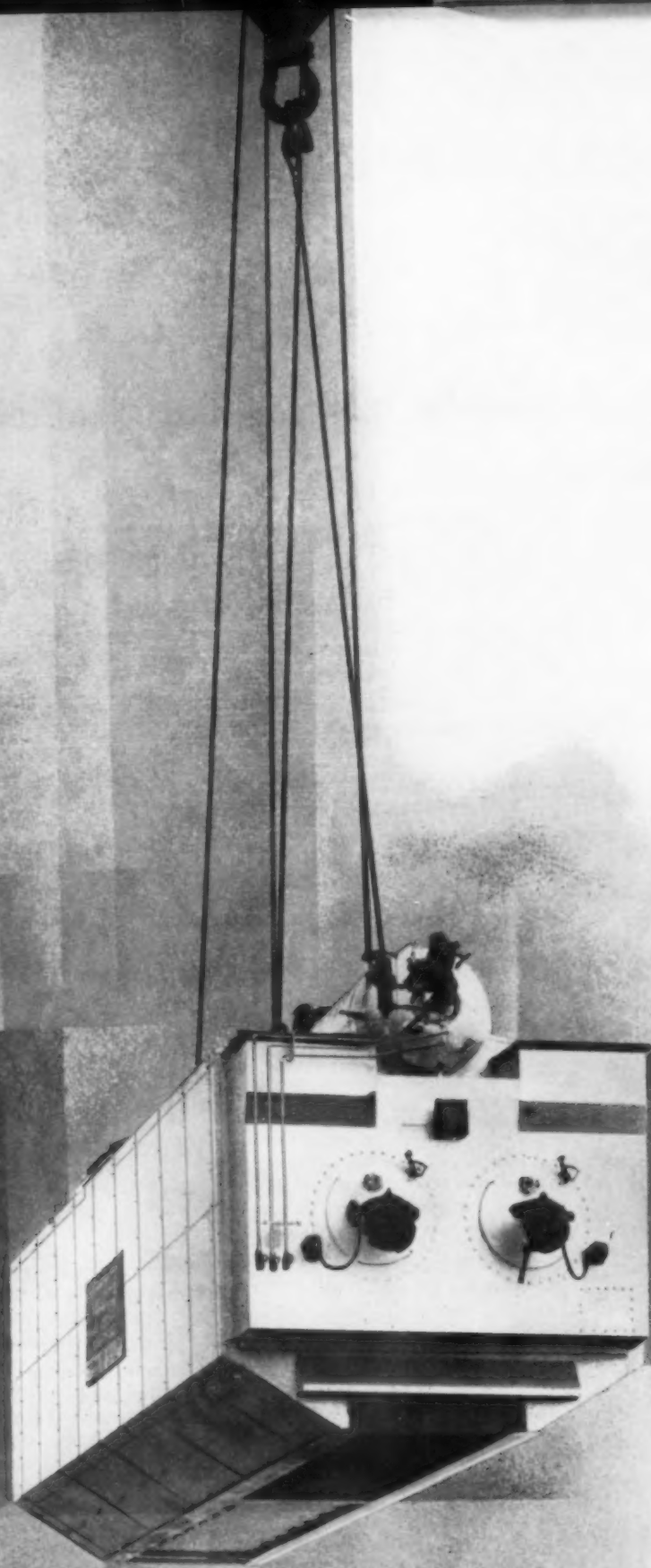
If it should come up, notwithstanding, there is an equally good chance of its appearing basically as a bargaining element, rather than an end in itself.

Another way of getting in the first punch, is for the company to initiate voluntarily some form of birthday recognition of their own. This recognition could be made contingent on a designated level of performance, or on having achieved say 10 years of dependable and faithful service, thereby setting up the rule that birthday honors must be earned, and are not granted lightly.

As we see this problem, birthday holidays are less matters of featherbedding, or of getting something for nothing, than they are elements in the struggle for individual status. Every human being likes "to be somebody," and for his employer to give him his birthday off with pay, certainly enhances this man's feeling of importance.

If this factor in the demand is understood, and the company red carpet is trotted out for the individual rather than for the mass, the results can be rich in developing management-employee good will. Even if the "red carpet" treatment means no more than the sending of a special birthday card to a man's home, that card can be valued highly. It can become a real mark of distinction — provided *everybody* doesn't get one.

The point to remember is that a demand for birthday holidays could mean that the company in the past has been following the policy of treating employees too much in the mass, and too little as individuals. This possibility is worth examining.



a large package boiler that will give you maximum efficiency and economy

You get most efficient steam generation when you select a boiler that's designed for your specific duty range. The B&W Type FO Package Boiler is your best buy if your requirements are in the range of 50,000 to 100,000 lb/hr. Not an enlargement of an existing product but a completely new oil and gas-fired boiler, the Type FO is engineered to give maximum efficiency, economy and quality.

... Check these B & W Type FO Package Boiler Benefits

Optimum Output because heating surface and furnace volume are properly balanced. And because B&W builds both the boiler and burner, they go together as a completely integrated steam generating package.

Minimum Maintenance is "designed in." For example, you get *natural* circulation, completely water-cooled furnace, skin casing, drainable superheater design.

Greater Efficiency Over Entire Operation Life optimum heat absorption—top burner performance—forced draft operation—constant steam temperatures over a wide load range.

Start Up Assistance B&W's extensive service organization assists you in starting up your boiler and gives instruction in its proper operation.

Whatever *your* particular steam requirements, check with B&W engineers when making your decision. You'll find a range of package boilers with industry-leading features. Call your local B&W representative or write direct to The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

**B & W****THE BABCOCK & WILCOX COMPANY****BOILER DIVISION**



Tampa Electric Celebrates Safety Record

JUST WHERE would be the most fitting place to hold a dinner to celebrate an outstanding safety accomplishment by power station personnel? This was a problem that confronted officials of Tampa Electric Company recently. The solution: Hold it in the boiler room of the power plant, of course.

Personnel of Tampa Electric's Peter O. Knight power station, the oldest station in the Company's generating system, recently completed a record of more than two million man-hours without a disabling injury. This safety achievement covered a period of some eleven years and is quite an outstanding accomplishment by any standard.

Tampa Electric obtained the services of an outside caterer to set up tables and furnish the vegetables, salad, dessert and beverage, but the actual entree, delicious T-bone steaks, were cooked over charcoal right on the boiler room floor. Chefs for the occasion were Norman M. "Barney" Johnson, Chief Engineer at the Peter O. Knight power plant, and H. A. "Ham" Moshell, Jr., Superintendent of Production for Tampa Electric.

Following the dinner, William

C. MacInnes, president of Tampa Electric, in a brief ceremony, presented an Edison Electric Institute Safety Achievement Award to "Barney" Johnson for the personnel of Peter O. Knight station.

The award read: "For Outstanding Performance in Accident Prevention having worked 2,006,442 man-hours without a disabling in-

jury from March 14, 1948, to October 11, 1959."

Sharing in the company-wide pride of this accomplishment is Jack Davis, Tampa Electric's Safety Director, and his staff, who hope that this is only the first boiler room steak dinner that will be earned by members of the Florida utility's power station personnel.

Static Excitation System

A NEW STATIC excitation system concept eliminating moving parts for ease in maintenance on medium capacity steam turbine-generators has been developed by the General Electric Company.

The system was designed by the company to replace rotating exciters in the industrial and utility areas.

An order for one of the new exciters has been placed with General Electric. The unit, now being built by Medium Steam Turbine, Generator and Gear, will have a 90 kilowatt system for a 25,600 kva, generator.

It will be factory-tested this spring, with installation scheduled for the latter part of this year.

Prime advantage of the new excitation system is the elimination of all moving parts, according to a company design engineer who said servicing, if necessary, can be undertaken without removing the load from the generator.

Paper, oil and chemical plants will benefit most from the static system, where rotating exciters have been subjected to chemically polluted atmospheres that fouled the contact between the copper commutator and the carbon brushes.

Some of the advantages to the General Electric static design include:

1. It corrects voltage dip quickly, thus assuring minimum disturb-

ance to electrically-powered process equipment.

2. It maintains excitation at a high level during system disturbances, helping relays to clear faults quickly and to restore system voltage to normal.

3. It is flexible in arrangement and requires no special foundations.

The design of the static exciter differs primarily from the conventional in that the power is obtained from connection to the generator terminals, instead of from the mechanical drive of the turbine-generator shaft.

An ingenious feature of the G-E design is that the circuit utilizes both a current transformer and a potential transformer as the power source. Each provides about half the normal load.

With this arrangement, if there is a prolonged system fault, the generator voltage drops and the potential transformer output approaches zero. At the same time, however, generator current will rise to several times normal, giving a power output through the current transformer, which not only will offset the loss of power, but will give additional field forcing.

The system provides for current and potential transformers in all three phases, so that excitation will increase during line-to-line or line-to-ground faults, as well as during three-phase faults.

The system uses automatic voltage regulators and silicon diode rectifiers, both components of proven reliability.

Under normal conditions the regulator merely makes minor corrections to compensate for field winding temperature changes, saturation effects and the like. Under transient conditions, however, the regulator may supply additional power to force the field.

The rectifier cells will be arranged in two separate three-phase bridges, each of which will have a circuit-breaker on the alternating current and the direct current sides. Normally, the bridges will be operated in parallel, but each can be isolated for maintenance.

The rectifiers will be arranged so that a faulty cell can be replaced in approximately one hour.

HOW TO educate



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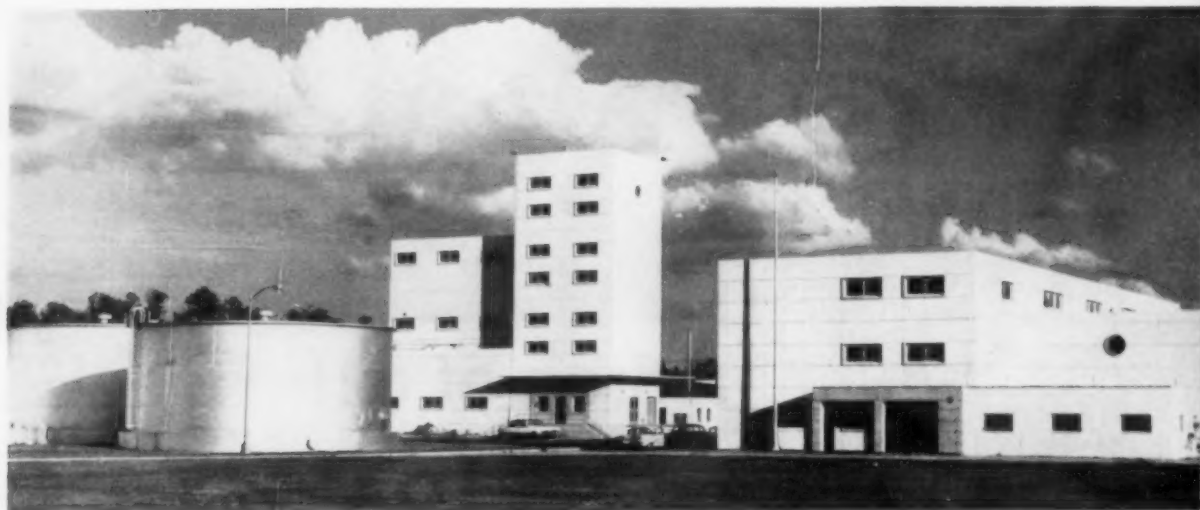
Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS

SINCE 1898



H. T. Oberly, Superintendent of the Water Department, St. Petersburg, Florida, shown leaving the Municipal Water Works Building. The efficient, modern Cosme pumping station shown below is one of two serving the growing St. Petersburg area.



"The Westinghouse Inspection Contract is the best maintenance investment the city Water Department ever made"

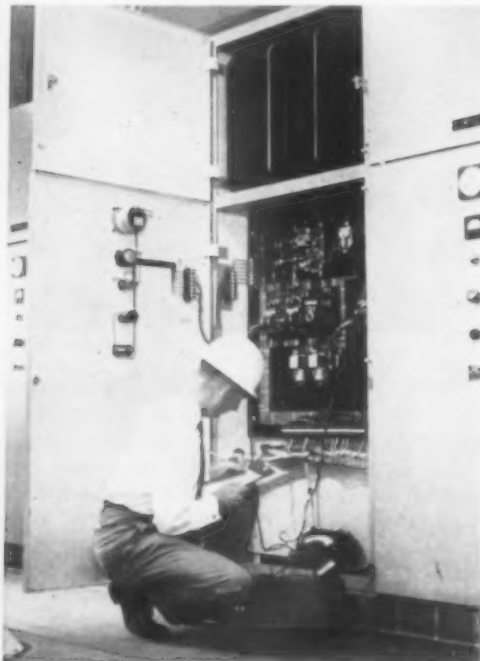
says Mr. H. T. Oberly, Superintendent of Water Works, St. Petersburg, Florida

During initial inspections at the two St. Petersburg Water Works pumping stations, Westinghouse Field Service Engineers discovered two serious problems. Without immediate action, these defects could have caused water shortage emergencies in the city. Insulating oil in a power transformer at one site had a dangerously high acid content . . . needed immediate filtering and retreating. In the second instance, a stand-by generator was found to have a grounded field coil. The unit has always been used in emergencies and during heavy electric storms. It is routine operation to switch to an emergency generator in these instances. It has a weekly hour's run if there have been no power failures.



Mr. Putnam, Supervisor of Washington Terrace station; and Roy Love, Westinghouse Field Service Engineer, check the layout of the transmission portion of the pumping station. Power coming into this substation is used to run the pumping equipment.

Westinghouse Field Service Engineer inspects, tests and makes minor adjustments on all the electrical equipment in one of the St. Petersburg pumping stations. Pictured is one of the thorough electrical checks on the control circuits.



The St. Petersburg Municipal Water Works signed up for the Westinghouse Maintenance Inspection Contract a little over a year ago to cover the Washington Terrace and Cosme pumping stations. In addition to exhaustive checks of the electrical system, the Westinghouse Field Service Engineer inspects all the electrical controls and rotating equipment. Mr. H. T. Oberly says it's the best maintenance investment his Water Department ever made.

You can now have a Westinghouse Field Service Engineer check and test all your electrical equipment under contract—weekly, monthly or yearly, depending upon your needs. Behind him he has the complete resources, research, engineering, man power and facilities of Westinghouse. These scheduled inspections, adjustments and recommendations can prevent equipment failure, reduce outages and down time to a minimum. Yet your cost is amazingly low . . . generally, much less than 1 percent of the value of your equipment.

For complete information, call your Westinghouse sales office or write: Westinghouse Electric Corporation, 1299 Northside Drive, N.W., Atlanta 2, Ga. (Available in the Westinghouse Southeast Region only.)

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New Steel Warehouse for Virginia Paper Mill

CHESAPEAKE Corporation of Virginia, West Point, Virginia, is engaged in an expansion program that will cost more than three million dollars during this year and next. One of the major parts of this expansion involves a new 45,000 square foot warehouse designed to store 10,000 tons of kraft paper and paperboard prod-

ucts. This warehouse is a multiple Armco truss-type steel building, consisting of two building units, joined at the sidewalls.

The reason for the new warehouse is to improve service to customers. It is planned to stock specific grades of paper so the Corporation will be able to provide immediate shipment to customers

This Armco steel building of the Chesapeake Corporation of Virginia, erected as a warehouse to improve customer service, is part of an extensive expansion program. Dark streaks in roof show (upper photo) location of translucent panels.

Taken without artificial lighting, the lower photo shows the daylight brightness provided by the translucent roof panels. Clamp truck, shown handling paper rolls, has a capacity of 6,200 pounds at height of 22 feet.

who have emergency requirements. Also, being able to fill many orders immediately from the warehouse will reduce the necessity of interrupting the running schedule of the paper mill.

Erik Zimmerman, vice-president in charge of production, said: "This warehouse is designed so that it can be expanded as additional storage capacity is needed."

The warehouse is 170 feet wide, 266 feet 8 inches long, with an eave height of 26 feet. The roof is of aluminized steel. Translucent panels have been inserted in the roof to provide daylight lighting.

Automatic Lubrication for Tilt-Saw

CUTTING ALUMINUM tubing with a standard tilting saw is not the most difficult job in the world, but work stoppage to manually wax the blade took a big bite out of the production schedule at a Florida plant.

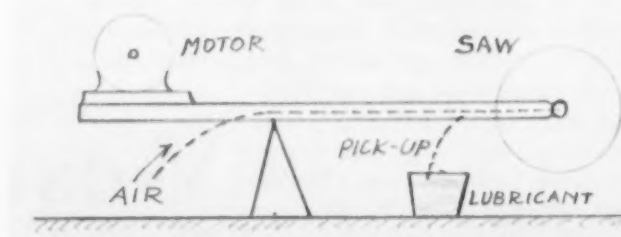
Since all the tubes for the product they manufacture are cut to the same lengths, they had rigged up a simple trough and stop arrangement, so that the cutting with a tilt-saw could be done by inexperienced help.

Downtime due to waxing and repeated blade sharpening posed

a problem which was licked with a simple continuous lubrication system set up as shown in the sketch below.

A compressed air line was led

in along the base of the saw with its outlet split at the blade so that it contacts both faces at the hub. A small pickup tube was run from the air line to a container holding the lubricant and it was made short enough so that it extends into the lubricant only when the saw is brought into operating posi-



tion. A simple cut-off valve regulates the air flow so that it, too, operates as the saw is swung into cutting position.

The following results have been noticed: 1. Downtime for lubrication has been eliminated. 2. Centrifugal action keeps the blade fully lubricated only when cutting. 3. Blade performance and life has been improved. 4. Longer runs between sharpenings have been achieved.

Waste Wood Stoker

THE HOLLY HILL Lumber Company produces about 100,000 board feet of lumber a day and formerly tried to operate on seven HRT boilers fired with all kinds of wood waste. Boiler efficiency was about 45-50 per cent, and output was insufficient for good operation with all seven of the old boilers operating.

The present water tube boiler equipped with an automatic stoker system for firing wood waste does the job automatically. Firing with wood waste is usually done manually; however, the automatic stoker system handles all kinds of wood waste from green sawdust to hogged wood. The stoker feeds air and fuel for efficient combustion and facilitates better boiler operation and capacity. Boiler efficiency is now about 70-75 per cent, and 65,000 pounds of steam is produced an hour at maximum capacity.

More even steam pressure is now evident, and this in turn improves quality in operational processes. Actually, production has increased about 17 per cent over the old installation. Further advantages include the elimination of objectionable smoke, fly ash, and cinders. More complete combustion has obviated the objectionable by-products of combustion.

Present operation maintains 150 pounds of steam pressure at all times. Kiln drying is much improved and now runs full time around the clock as compared to the interrupted schedule and marginal results formerly obtained. The stoker used in this instance was supplied by Applied Engineering Co.

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The
Difference
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STEEL SERVICE CENTER
AND A WAREHOUSE?

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It's more than a fancy name, to be sure. At least it is in the case of Atlantic Steel.

There's a lot more to this highly specialized business than simply maintaining adequate stocks, and thus eliminating heavy inventory cost for our customers.

It's stocking the *right kinds* as well as quantities of steel and aluminum products for instant shipment. It's providing accurate recommendations on various metals and helping customers find the most economical as well as the most suitable materials. It's the careful attention to every detail of every order.

Yes, there is a difference. Why don't you check up and find out? Just write, wire, or call collect—

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Quick Truck Loading Ramp

A **WOODWORKING** plant superintendent had need for rapid loading of highway delivery trucks to keep them working at good capacity and at a minimum cost. Loading by hand was too slow, and he had no fork trucks nor cranes.

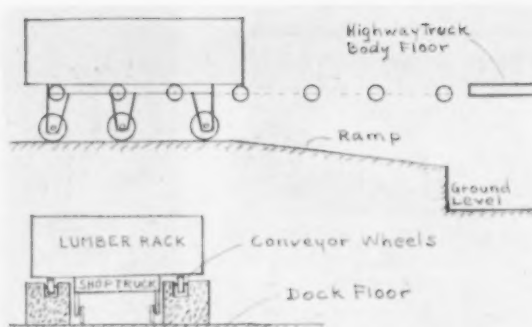
He had plenty of standard shop trucks of the type commonly used in lumber plants, and of course plenty of cheap rough lumber.

After considerable study, here is how he solved his problem. He built a concrete ramp at the edge of his shipping dock, where the highway trucks could back in to receive their loads. Its vertical dimensions are such that a shop truck, rolling out on the level dock at the high end of the ramp has its body floor somewhat higher than the floor of the highway truck backed in at the lower end of the sloping ramp.

On each side of the stall are a set of conveyor wheels, set on solid supports, so that the two rows of wheels form a level conveyor top slightly higher than both the highway truck and the shop truck.

Each shop truck carries a lumber rack that is free to move across the length of the roller conveyor. These lumber racks are wide enough to project over the shop truck sides sufficiently to engage the conveyor wheels on each side as they move toward the rear of the highway truck.

In operation, an order of lumber is loaded at any time inside one of the lumber racks placed on a shop truck. When ready to ship, it is pushed out on the shipping dock, the load placed easily on the conveyor wheels, which were placed on each side of the loading stall. The shop truck discharges relieve its load as it progresses down the ramp, by dropping away from the loaded



lumber rack, which then rest on the wheels of the level conveyor ready to be shoved on a highway truck.

Thus both the shop truck or the highway truck can be ready for service at any time with practically no delay, as the shop truck can be unloaded, or the highway truck loaded in only seconds.

The steel strapped highway truck floor makes loading easy. The slanting ramp down which the shop truck rolls, leaving its loaded lumber rack supported on the wheels of the level conveyor, makes that operation a simple trick also. The lumber rack stays with the highway truck to and from the customer's location.

This device need not be limited to the handling of lumber. Many types of merchandise could be handled in similar maneuver. The sketch shows how this particular set-up was made, but necessary variations will occur to those designing a comparable device for other services. For instance, some type of small rollers might be necessary to facilitate pushing the "pallet" on to the highway truck if loads are too heavy to skid easily on the truck floor.

Production Planning and Control

THERE HAS never been a time in history when every phase of production and management has been so thoroughly subjected to scientific scrutiny to promote efficiency as at present. Scientific management in the United States had its beginning in the 1880's. From this time on we are out-moding systems every day to replace them with still more modern ones.

New ideas are being born by the day in standards for work performance, maintenance and accounting. New and daring methods of motivating workers to more productivity are being born. Work groups with no foreman, eliminating time cards, all this points

to building confidence, honesty, respect and integrity reciprocally for production workers and management. Fostering these attributes will do much to increase employee morale, loyalty and plant production.

No business, large or small, can indefinitely postpone the use of the principles of scientific management. *Production control*, one facet of management's responsibilities, has had its share of attention in new developments and techniques. Flow or routing, scheduling and dispatching have been studied to set a standard basic requirement for production planning and control.

Our plant was surveyed, and it

was found that our method of production control had not had any major changes for the past eight years. So we quickly set to work to find out the advantages and disadvantages of our system. Although the system was fulfilling its function, we found there was much room for improvement.

A great deal of available literature and information was compiled, analyzed, and condensed for our use where it would apply. Although the basic requirements for a good production control program are the same as in other plants, it was found that ours was a seasonably influenced production. Our program had to be tailored to suit many varying conditions. Factors influencing the design of our system had to be worked out, and we had to consider the fact that we

have a continuous manufacturing flow and assembling, combined with special product manufacturing.

Our procedure for setting up our program was as follows:

1. Preplanning to establish requirements.
 - (a) Accumulate data and specifications on product.
 - (b) Formalize and set up an inventory and control system on both raw material and finished product.
 - (c) Accumulate data on plant processes and manufacturing machinery output limitations.
 - (d) Initiate sales forecasting to determine production requirements.
2. Designing the method and procedures for production planning and control.
 - (a) Make up route sheets for sequence of operation for supply of component parts and product to be manufactured.
 - (b) Set up daily data sheets for scheduling production.
 - (c) Initiate system for processing new orders.
 - (d) Set up system for dispatching production plans.
 - (e) Put into effect procedure for controlling output.
3. Organizational structure for production control.
 - (a) Set up personnel to carry out and operate system.
 - (b) Assign specific duties and responsibilities allowing men to function efficiently.

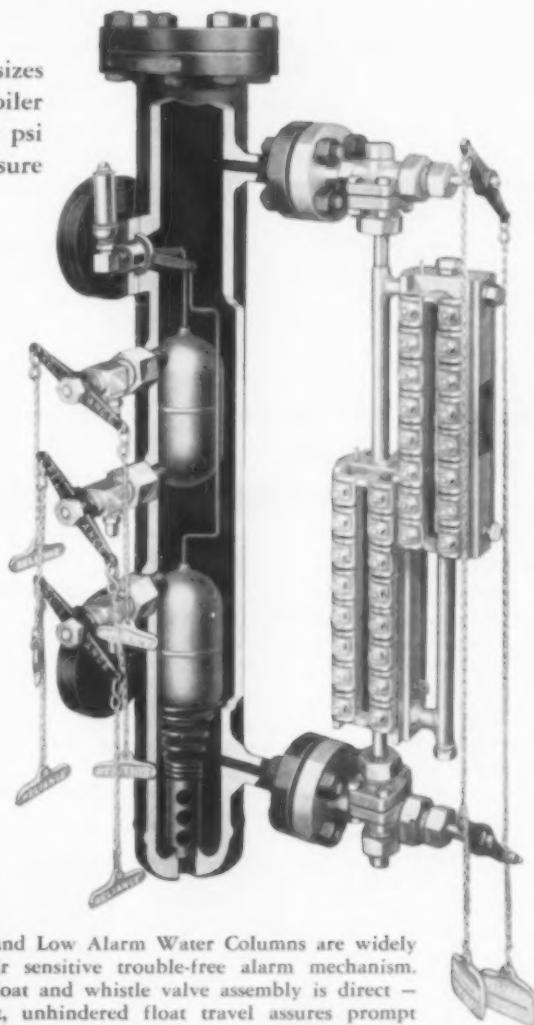
Although the present system was composed partly of the above, additional consideration helped to make the overall system more efficient, cut out unnecessary record keeping, prevent delays by planning ahead and reducing the guesswork when expediting raw materials into production on time.

A little time and effort has paid dividends on initiating a better Production Planning and Control program. With today's changes in technology and scientific management one must be ever vigilant, for today's good program is tomorrow's obsolete program.

By **THOMAS T. SCALA**, Plant Manager, Lock Joint Pipe Co., Columbia, S. C.

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DEVICES

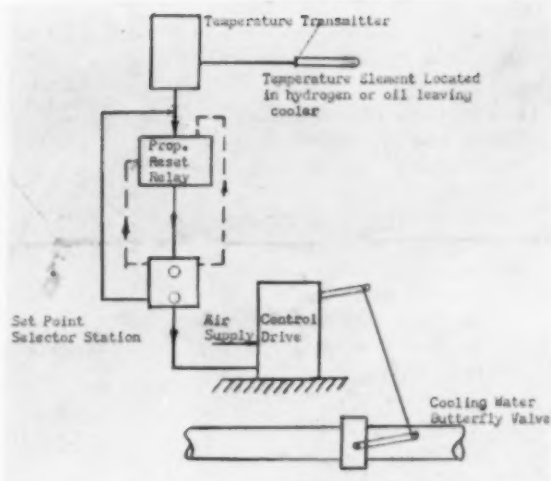
Automatic Temperature Controls

THE SCHEMATIC diagram shows an automatic generator hydrogen or turbine generator bearing oil temperature control system. The temperature element senses the temperature to be controlled and the desired operating temperature is obtained by manipulation of the set point selector station.

The installed cost of this automatic control system is about \$1,750.00 which is justified by the saving of hydrogen gas, reduction of thermal shock to the generator windings and/or turbine generator bearings and by the need of fewer plant operators.

The plant where one such control unit is installed, and others are planned, is a 3 unit plant with only a 4 man operating crew. It is necessary to shut down one unit each night in this plant, thereby adding to the work load of the crew.

These automatic controls will relieve the operators of six manual regulating chores, even when starting and stopping a turbine generator, allowing them to direct more attention to other jobs. It is felt that



other companies can improve plant economy by using this type automatic controls.

By A. R. COX, Mechanical Engineer,
West Texas Utilities Company, Abilene, Texas

Handling Modernized . . . Garysburg, N. C.

Rubber-Lined Pump Cuts Cost

REDUCING handling costs and improving operations at the Garysburg, N. C. plant of the Bryan Rock and Sand Company is an Allis-Chalmers rubber-lined pump that is noteworthy for several reasons.

Installed to modernize material handling methods, the pump replaced a stacker and conveyor

previously used to transport concrete and masonry sand separated from gravel in the washing portion of the plant. From the conveyor discharge point, the sand was formerly moved by front-end loader and bulldozer to large storage areas away from the gravel operations.

In the present arrangement, sand

discharge from the washer is retained in a slurry form, immediately drawn by the 10- by 8-inch rubber-lined pump and transported through a hose to any selected storage area. Operation is continuous and requires virtually no attention. In addition to facilitating this material handling operation, the pump frees the bulldozer and front-end loader for other duty.

Results from the first year's operation show 2000 tons of abrasive sand being moved in the average 9-hour day with only one minor pump part requiring replacement.

The pump, 125-hp electric motor, and Texrope V-belt drive were supplied by Allis-Chalmers Norwood Works. Open motor construction, possible by using Silco-Flex insulation, eliminated the need for more costly totally-enclosed type of motor usually required for severe duty or outdoor installation.



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PLANT SERVICES

Bowaters Paper Mill Catawba, S. C.

(Continued from page 33)

been provided; on black liquor three per cent nickel-stainless trim gates are used. Ni-resist plug valves are provided for white and green liquor service.

The mill has been adequately supplied with control instruments. The digester pressure and temperature is automatically controlled. The liquor measuring system can be controlled either by the level or flow method with automatic drawdown and refill. Magnetic flow meters are used on stock flows with consistency being controlled largely by pressure type regulators.

All pertinent levels, flows, pressures, temperatures, conductivities and consistencies are recorded and controlled with the control instruments being mounted on panels which are centrally located on the operating floor of each building.

Electrical System

Power is obtained from a 15,625 kva turbogenerator at 13,800 volts, 3 phase, 60 cycle. The Duke Power System provides a tie line from a 100,000 volt to 13,800 volt substation which is used for startup, emergencies, and to supply blocks of power as the plant demand expands beyond the initial generating capacity.

The mill primary distribution system is of the resistance grounded simple radial type with 13,800 volt circuits feeding power to departmental load centers. Utilization voltages are 2300 volts for motors 200 hp and larger and 440 volts for smaller motors and the lighting distribution system.

Load center unit substations and motor control equipment is grouped by department in ventilated pressurized control rooms. The 2300 volt master unit substations consist of an income line disconnect, 2000 or 3000 kva askarel filled transformer, and integral or remote located medium voltage motor control. The 440 volt load

(Continued on page 70)

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Bowaters Mill

(Continued from page 69)

center unit substations consist of a fused incoming line disconnect, 1000 kva askarel filled transformer, and integral low voltage air circuit breaker switchgear.

Grouped motor control centers

provide power to the 440 volt loads. Motor control units consist of disconnect switches and high interrupting capacity time lag fuses in combination with magnetic starters. Single phase space heating for splashproof motors provides a low voltage circulating current through the motor windings

to keep them warm and dry when not in use.

The mill wiring system is made up of polyvinylchloride jacketed aluminum interlocked armored cables installed on aluminum ladder type racks. The 13,800 volt feeders are varnish cambric insulated, three conductor cables;

PLANT SERVICES — BOWATERS CAROLINA CORPORATION

List of Suppliers of Plant Service Equipment

Adco Div., Yuba Cons. Ind.—Heat Exchangers & Expansion Joints
 Allis-Chalmers Mfg. Co.—Filtration Plant—Backwash Pump
 Atwood & Morrill Company—Steam Relief Valves
 Babcock & Wilcox Company—Combination Boiler & Auxiliaries Recovery Boiler & Auxiliaries
 Bailey Meter Company—Boiler Controls
 Betz Laboratories, Inc.—Chemical Feed Pumps
 Blaw Knox Company—Wood Handling Grapple
 Bowser Incorporated—Turbine Oil Conditioning Equipment
 Brown Fintube Company—Fuel Oil Heaters
 Buffalo Pumps, Inc.—Pumps
 W. E. Caldwell Co.—Elevated Water Storage Tank
 Cameron & Barkley Company—Pipe Hangers, Butt Weld Pipe, Flanges, Cable Terminators, Conduits & Condulets
 Carolina Concrete Products Co.—Concrete Pipe
 Catawba Wholesale Electric Co., Inc.—Conduit, Lamps
 Chain Belt Company—Travelling Screens, Grit Conveyor, Grit Collectors—Woodyard Area
 Chapman Valve Mfg. Co.—Non-Slam Check Valves
 Columbia Pipe Co.—Vitrified Clay Pipe & Fittings
 Continental Conveyor & Eq. Co.—Belt Trippers
 Covil Insulating Company—Insulation Materials
 Crane Company—Special Valves, High Pressure Piping
 Cyclone Fence Company—Fence
 DeLaval Separator Company—Blow Heat Exchanger
 Detroit Stoker Company—Roto Grate Stoker and Refuse Distributor Feeders
 DeZurik Sales Company—DeZurik Control Valves
 Dings Magnetic Separator Co.—Magnetic Head Pulley & Electromagnets
 Dixie Bearings, Inc.—Pillow Blocks
 Edgcomb Steel Company—Stainless Steel Pipe & Fittings
 Electric Machinery & Mfg. Co.—Special Purpose Motors
 Electric Motor Sales & Supply Co.—Peerless Pumps
 Elliot Company—Fuel Oil Strainers
 Elliott, J. H. Company—Grinders, Drill Press, and Hydraulic Press
 English Electric Export & Trading Co., Ltd.—Large Electric Motors
 Falk Corporation—Speed Reducers
 Fischer & Porter Company—Flow Indicators
 Fisher Governor Company—Control Valves and Liquid Level Controllers
 Joseph H. Fox—Reinforcing Steel
 Foxboro Company—Control Instruments
 Fulghum, R. L. Company—Conveyor Drives
 Fuller Company—Airveyor Systems
 Gary Steel Products Corporation—Tanks
 General Electric Company—Turbogenerator and Substations, Motor Control Centers
 Goslin Birmingham Mfg. Co.—Black Liquor Evaporators
 Grand Machinery Company—Machine Shop Equipment
 Graver Water Conditioning Co.—Deaerating Feedwater Heater
 Graybar Electric Supply Co.—Lighting Fixtures and Pole Line
 Greenville Textile Supply Co.—Crouse Hinds Condulets, Tape and Tools
 Hammond Iron Works—Steel Tanks

Harbison-Walker Company—Refractories
 Hungerford & Terry, Inc.—Demineralizer Equipment
 Husky Products Inc.—Cable Support System
 Industrial Piping Supply Company—Cast Steel Valves, IBHM, Bronze Mounted Valves, Ni-Resist Valves, Nordstrom Valves and Diaphragm Valves
 Ingersoll-Rand Company—Boiler Feed Pumps with Terry Turbine Drive and Air Compressor
 Kensington Steel Company—Chain, Sprockets and Shafting
 Koppers Company, Inc.—Electrostatic Precipitator
 Kraft Equipment Company—Reducers — All Areas
 Link Belt Company—Rotary Plate Chip Feeders
 Ray Long Equipment Company—Wood Handling Equipment
 Luria Engineering Company—Prefabricated Buildings
 Lyons Metal Products—Lockers & Shelving
 Manning, Maxwell & Moore—Overhead Cranes
 Metal Products, Inc.—Instrument Tubing, Instrument Tubing Support, Miscellaneous Steel, and Aluminum Tubing
 Miller Hoff, Inc.—Bark Storage Bin & Feeding Machine
 Mill Power Supply Co.—Pole Line Materials, Grounding Wire and Rods
 Mills & Lupton Supply Co.—Thermometers and Gauges
 Montague, B. L. Company—Structural Steel, Log Flume Extension, Conveyor Pulleys & Idlers, and Bearings
 Moore Handley Hardware Supply Co.—V-Belt Drives
 Herbert Morris, Ltd.—Machine Shop Overhead Crane
 Nash Engineering Company—Vacuum Pumps
 Okonite Company—Neoprene Line Wire, Wire and Cable
 Otis Elevator Company—Freight Elevators
 Pennsylvania Pump & Compressor Co.—Air Compressors
 Pittsburgh Lector Dryer Division—Dehumidifier for Control Air and Air Dryer
 Pomona Terra-Cotta Company—Vitrified Clay Pipe & Fittings
 Reliance Electric & Eng. Co.—Motors and Drives
 Roberts Filter Mfg. Co.—Filtration Plant Mechanical Equipment and Piping
 J. O. Ross Eng. Corp.—Ventilation Systems
 S & S Machinery Company—Machine Shop Equipment
 Shealy Electrical Wholesalers—Distribution Panels
 Socony Paint Products Co.—Paint
 Southern Corporation—Woodhandling Grapples, Saran Lined Pipe & Fittings, and Fabri-Valves
 Sullivan Hardware Company—Switches, Fuses, and Mercury Vapor Lighting Fixtures
 W. D. Taulman & Associates—Turpentine Condenser and Blow Heat Condenser
 Taylor Instrument Company—Fuel Oil Temperature Controllers
 Toledo Scale Company—Automatic Dial Truck Scale
 Trane Company—Ventilating Units
 Viking Pump Company—Soap Pumps
 Wallace Concrete Prod. Co.—Concrete Pipe
 Warren Pumps, Inc.—Fuel Oil Pumps
 Westinghouse Electric Corp.—Electrical Controls, Operator Panels, and Turbine Surface Condenser
 Westinghouse Electrical Supply Co.—Lighting Fixtures, Transformers and Lighting Panels
 White, James C. Company—Instrument Valves and Instrument Fittings
 Williams Gauge Company, Inc.—Steel Check Valves
 Worthington Corporation—Centrifugal Black Liquor Pumps

and the 2300 and 440 volt cables are butyl rubber insulated.

The lighting systems are fed separately from each departmental load center with a manual throw-over to an alternate feeder supplied from an adjacent area. Mercury vapor filament combination fixtures, color corrected, are used in the turbine hall and on the pulp drying and finishing and shipping operating floors.

General Facilities

A two-story facilities and administration building of approximately 19,800 square feet has been located adjacent to the main entrance road and gate, and provides facilities for watchmen, first aid, personnel office, time and payroll offices, as well as offices for the management, woods, and administrative departments.

At ground level a main locker room of tile has been provided with locker space for 36 foremen, and 440 production and maintenance employees. Mill offices have been conveniently located in the central part of the mill.

To make all areas accessible by truck or car, a two lane road system has been provided. Two parking lots have been provided in the vicinity of the facilities building.

Both the Southern and the Seaboard Airline Railways serve the mill site with spur tracks from their main lines. There are approximately 20,000 feet of track inside the mill area for servicing the plant.

In addition to the demands of the pulp mill, such utilities as steam, electric power, and water will be furnished the Bowater Board Company plant which is being constructed adjacent to the pulp mill.

Personnel

Personnel at the Bowaters Carolina Corporation Plant includes: T. C. Bannister, Jr., General Manager; J. E. Mailhos, Superintendent of Utilities, Maintenance and Engineering; L. W. Camplong, Purchasing and Traffic Agent; J. C. Clark, Technical Superintendent; M. W. Bates, Plant Engineer; W. S. Finniken, Power Superintendent; F. B. Jones, Master Mechanic; and J. E. Stutts, Electrical-Instrument Supervisor.



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MAINTENANCE—TOOLS EQUIPMENT & METHODS

2—Electrical Maintenance — New contract service (for Southeast only) inspects and tests motors, generators, gearing, control and distribution systems, at a cost less than 1% of value of equipment. — Atlanta office of WESTINGHOUSE ELECTRIC.

4—Spotcheck — You can save time, money and labor in finding cracked parts quickly and easily with this \$36.00 Spotcheck Kit — a dye penetrant inspection technique. Bulletin describes complete fire-safe materials and kit. — MAGNAFLUX CORP.

17—Mechanical Packings — 32 page Cat. PC-103 describes a variety of packings and gaskets, including self-lubricating, sheet and molded packings. Includes application charts and price information. — GREENE, TWEED & CO.

18—Maintenance Ideas — 4-page folder highlights 90 ways Kane Kroil and other products can help the man-in-the-plant. — KANO LABORATORIES.

29—Belting Repairs — Two bulletins "How to Properly Join Belts" and "Belt Fastener Selection Chart" offer service help on conveyor, elevator and transmission belting. — CRESCENT BELT FASTENER CO.

34—Floor Maintenance — 4 page catalog describes metallic, asphalt, latex, epoxy and other products for hardening, resurfacing and patching concrete or wood floors. — A. C. HORN COMPANIES.

45—Correct Lubrication — "Lubriplate Data Book" shows importance of providing and maintaining proper and economical maintenance of all types of plant machinery through adequate lubrication. — Lubriplate Div., FISKE BROTHERS REFINING CO

53—Steam Line Treatment — Folder describes alkaline IPCO S-L-T. Used in boiler water, it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings. — IPCO LABORATORIES, INC.

64 — Anti-Corrosive Paints — Bulletin, "The Application of Subox and Subalox Paints," gives the story

of a complete paint system for weather, moisture and alkali protection, with details as to application. — SUBOX, INC.

70—Multi-Purpose Grease — Bulletins describe single product Gulfocrown grease (4 consistencies) that does the work of many—simplifies application and avoids errors, reduces inventory and cuts lubrication costs; grease gun or centralized system application. — GULF OIL CORPORATION.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

107—Proportioning Pumps — 4 page brochure illustrates and describes company's proportioning pumps and package chemical feeding units. Includes applications and specifications. — THE BIRD-ARCHER CO.

122—Industrial Fans — Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — CLARAGE FAN CO.

135—Heat Exchanger — Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to outdoor air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. — NI-AGARA BLOWER COMPANY.

143—Chemical Feeders — 36 page Bul. 1136 describes metering pumps — types, construction, displacement and operating pressures. Gives handling recommendations for chemicals, acids, etc., and volumetric conversion tables. — MANZEL.

157—Pumps for Corrosive Liquids — 4 page Bulletin 5252-J describes 8 centrifugal pumps particularly adapted for handling corrosive liquids. Useful chart shows materials of construction available. Sizes, ratings, etc., briefed. — GOULDS PUMPS, INC.

160—Boiler Feed Pumps — 12 page Bulletin 122 describes and illustrates the type BFI high pressure pumps. Design features, service ratings and engineering data included. — PACIFIC PUMPS, INC.

169—Airfoil Fans — Bulletin 179 covers complete line of Airfoil mechanical draft fans for forced and induced draft featuring wide range

of pressure-volume ratios, high efficiency, low noise level, rugged construction. — GREEN FUEL ECONOMIZER CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

201—Valves & Gages—Handy guide No. 36 gives data and prices on valves, liquid-level gages and accessories for process and power industries. — PENBERTHY MFG. CO.

205—Draft Gages—Bulletins describe inclined, vertical tube, air filter gages, straight line and dial pointer type, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters. — ELLISON DRAFT GAGE CO.

218—Liquid Level Controls — Selection chart of "in stock" displacement type magnetrols. Details pump controls and low or high level alarm controls. Wide range specific gravity settings; standard length stem can be cut in field to job requirements. — MAGNETROL, INC.

222—Pressure Regulators — Catalog No. 77 illustrates and describes application, operation and specifications for a complete line of reducing, back-pressure and pump-pressure regulators. — MASON-NEILAN.

224—Feedwater Regulator—Bulletin 1044 describes the BI Feedwater Regulator, the single-element unit employing a thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

253—Combustion Analyzer — 4 page Specification E65-5 describes the "Heat Prover" which indicates per cent by volume oxygen and combustibles present in exhaust gases from all types of boiler and industrial furnaces. — BAILEY METER COMPANY.

256—Boiler Control — On-the-job report of Carolina Power and Light Company's Louis V. Sutton plant in Bulletin 1032. Features: combustion, feedwater, boiler feed pump recirculation controls plus automatic sequential soot blowing. — COPES-VULCAN DIVISION.

265—High Pressure Water Columns — Brochure BO — Introduction to high pressure (251 to 2500 psi) division of catalog data. Describes

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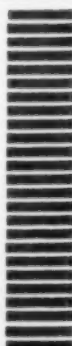
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Atlanta 8, Ga.



(Continued from page 72)

construction of higher pressure water columns; gives reference list of gages and supplementary equipment. — RELIANCE GAUGE COLUMN CO.

267—Remote Liquid Level Indicator — How clear, brilliant readings from any angle are possible with this unit is explained in Bulletin WG-1824. Pointer is always visible, even at extreme high and low water levels. Of manometric type with automatic temperature compensation. — YARNALL-WARING COMPANY.

281—Control Valve — 8 page Bul. J-170 describes sliding gate and plate control valves. Includes engineering data, cutaway drawings, features, application information, dimensional drawings, flow capacities, rating charts, flow curve and sample specifications. — OPW-JORDAN.

293—Metering & Control Systems — 4 page Bulletin 500 discusses pneumatic and electric telemetering. Includes pneumatic control and detailed literature references for all products making up metering and control systems. — BAILEY METER CO.

PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

300—Fact Folders — Up-to-date industrial fact-file folders on aluminum, steel, copper, stainless steel, insulation, roofing and other industrial supplies immediately available from 9 Southern warehouses. — REYNOLDS ALUMINUM SUPPLY CO.

301—Vacuum Cleaning Systems — How portable and stationary systems cut costs and increase plant efficiency shown in Booklets P8 and AB-100. Eight heavy duty units (1½ to 15 hp) for cleaning hard to get at areas, reclaiming valuable materials. — U. S. HOFFMAN MACH. CORP.

304—Backing Rings — Bulletin 56-2 describes rings designed for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in both shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper. — ROBVON BACKING RING COMPANY.

310—Incinerator — Metal cased, insulated, refractory lined incinerators for industrial and commercial use. City smoke code approved. Fast, economical installation — any size and capacity. — NORTH STATE PYROPHYLLITE CO.

315—Pressure Vessels — Catalog 100 discusses plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given. — J. J. FINNIGAN CO.

316—Drainage & Construction — Catalog Gen-10658 includes data on drainage and construction products for industrial uses. Includes corrugated metal pipe, paved-invert pipe, Asbestos-Bonded pipe, Multi-Plate pipe, pipe-arches, perforated pipe, water control gates. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

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338—4-D Wrought Iron — 8 page booklet discusses 4-D Wrought Iron which is 25% more corrosive resistant than standard wrought iron. Illustrated test section, applications and service conditions included. — A. M. BYERS CO.

342—Power Roof Ventilators — Bulletin 550 describes V-belt driven centrifugal type power roof ventilators. Pressures to 2" SP; capacities from 1500 to 26,500 cfm. — CLARAGE FAN CO.

386—Rigid Frame Buildings — 8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or

NEW SPI—APRIL—60 SERVICE AIDS for the Man-In-The-Plant

1—Emergency Chemical Cleaning — 4 page catalog highlights Anco solvents and service trucks available to remove scale, rust and other deposits from all types of heat exchange equipment. — ANDERSON CHEMICAL COMPANY.

24—Roof Maintenance — 4 page Catalog 5D describes Dri-N-Tite products for patching, priming and coating composition, corrugated or sheet metal, slag, gravel, concrete and felt roofs. — A. C. HORN COMPANIES.

235—Liquid Level Gauges — Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication. — LIQUIDOMETER CORP.

295—Two Fuel Cut-Out Controls in One — Float operated and electrode-operated fuel cut-out functions contained in one device. Bulletin D2.5 describes convenient optional hook-up possibilities for pressures to 350 psi. — RELIANCE GAUGE COLUMN CO.

bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

402—Forged Steel Valves — General Purpose Valves, Supplement No. 1 to Catalog F-9, covers gate, globe and angle valves, ½" through 2" sizes, for 150-800 pound service. Featuring 13% chrome stainless steel trim with hard facings. — HENRY VOGT MACHINE CO.

403—Valve Operators — Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

405—Temperature Problems — 4 page folder "Service for Efficient Thermal Conservation" covers insulation solution for high and intermediate temperatures, heating and air conditioning—low pressure steam, and ice water and frigid temperatures. — MUNDET CORK CORPORATION.

411—Steam Trap Book — 48 page manual reviews importance of good trapping. Gives complete data on traps and strainers. Contains complete selection, installation, testing (Continued on page 76)

365—Storage Water Heaters — Gas-fired, Scalefree 230 units described in Bulletin 4. Fully automatic package requires only simple connections. Available in more than 100 storage and recovery combinations. Storage capacities range from 250-4,000 gal. — THE PATTERSON-KELLEY CO.

555—Package Air Preheater — 14 page booklet tells how you can install this package unit at fraction of expense required for conventional heat recovery equipment. Fast and easy installation offering long term fuel savings. — THE AIR PREHEATER CORP.

592—Burners — 12-page illustrated Catalog AIA 30-C-1 covers complete line of commercial-industrial gas, oil, coal and dual-fuel burning equipment. Index and specification chart simplifies selection. — IRON FIREMAN MFG. CO.

871—Electrical Protection — Handbook tells how to select protective devices for circuits, motors and apparatus. Condenses all '59 Code references covering protection problems. Explains how installation costs can be cut and space saved with Dual-Element fuses. — BUSSMANN MFG. DIV.

Bulletins (Cont.)

and maintenance information. Many useful tables and charts. — ARMSTRONG MACHINE WORKS.

420—Valves — 24 page Catalog illustrates and describes bronze, iron, steel and corrosion-resistant valves for controlling the flow of water, oil, gas, steam and corrosive fluids. — THE WM. POWELL CO.

422—Welded Steel Pipe — 40 page catalog describes applications, advantages, standard specifications, production limits, linings and coatings, joints of welded steel pipe. Data tables, drawings, and illustrations included. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

425 — Steam Trap with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressure 10-600 psi. — SARCO COMPANY, INC.

429—Expansion Joints — 8 page Bulletin EJ-1915 describes Type W Gun-Pakt expansion joint which features an improved one-piece design of body and gland. Includes data on figuring expansion of pipe lines and suggestions for installing expansion joints. — YARNALL-WARING CO.

443—PVC Fittings & Flanges — Corrosion resistant polyvinyl chloride pipe fittings and flanges covered in 12 page catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc. — GRINNELL COMPANY, INC.

461—Reducing Valves — Bulletin 1027 describes diaphragm and piston operated regulating valves for pressure, temperature and liquid-level control. Complete specifications. — COPES-VULCAN DIV., BLAW-KNOX CO.

463—Stainless Steel Valves — Catalog 59 SS describes complete line of gate, globe and swing check valves with full details of valve patterns in alloys that satisfy requirements of most corrosive services. Includes section to show degree of resistance of alloys to many corrosive media under varying conditions. — JENKINS BROS.

468—Steam Traps — 40 page engineering manual aids engineers and maintenance men in sizing, specifying and buying of steam traps and other fluid specialties. All data necessary to engineer a trap installation is included. — V. D. ANDERSON CO.

475—Check Valves — How W-H Silent check valves can protect plumbing, heating and air conditioning systems from surge pressures and resulting water hammer described in Bulletin 654. — THE WILLIAMS GAUGE CO., INC.

BOILERS—STOKERS TURBINES—BURNERS

500—Underfeed Stoker — Type "R" multiple retort underfeed stoker in sizes from 20,000 to 500,000 lb of steam per hour; air and water-cooled types available; burns both low and high grade coals, wet or dry; either continuous ash discharge or power dump, with moving ash discharge plates. — AMERICAN ENGINEERING CO.

502—Feedwater Treatment — 4 page catalog tells how Braxton and Flako internally condition water so as to remove and prevent scale formation and corrosion in boilers. — ANDERSON CHEMICAL COMPANY.

504—Steam Generators — Bulletin AXY-1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability. — AMES IRON WORKS, INC.

505—Refractories — Paco High Heat Duty and Super Duty Plastic Refractories. Fire brick, high temperature cement, castables. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

506—Package Boilers — Practical construction with Continental two pass design described in Bulletin BE100. Units range in size from 20 to 600 hp; 15 to 250 pressures burning oil, gas or combination. — BOILER ENGINEERING & SUPPLY.

508—Steam-Turbine Unit — Medium condensing turbines utilizing either non-reheat or reheat; non-condensing turbines; single, double and triple automatic extraction turbines; admission units; and admission-extraction steam turbines for utilities and process industries described in Bulletin GEA-3277D. — GENERAL ELECTRIC.

509—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose. — NORFOLK AND WESTERN RAILWAY.

KEEP UP-TO-DATE USE SPI READER SERVICE

See Pages 73 & 74

**Here's 3-way steam cleaning
for only 81¢ an hour (avg.)**



**THE NEW
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ELECTRIC HYDRO
STEAM-JET
CLEANER**

SPEEDYLECTRIC

- No fumes • No noise
- No coils, tubes or heating elements to scale or burn out
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This heavy-duty unit does *all three*: steam cleans with water, steam and detergent...dry steams...and rinses with hot or cold water. Interchangeable operation—without interruption! Write for descriptive bulletin.

PANTEX builds a complete line of electric steam generators and electric and fuel-fired steam-jet cleaners. Technical bulletins available.

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516—Small Boiler Performance — 4 page Bulletin shows how the packaged Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels. — THE AIR PREHEATER CORPORATION.

519—Feedwater Deoxygenation — 12 page Bulletin BW-7 describes advantages of chemical deoxygenation of boiler feedwater with an aqueous solution of Hydrazine. Covers in detail the properties and action of Hydrazine in maintaining boilers as well as recommended methods of application. — FAIRMOUNT CHEMICAL CO., INC.

530—Coal Plant Specifications — 64 page brochure, including 5 drawings, is a comprehensive guide for preparing specifications on coal-fired, low-pressure heating plants in the size range of 750,000 to 5,500,000 Btu/hr. All aspects affected by choice of fuels from storage bin to stack design covered fully. — BITUMINOUS COAL INSTITUTE.

533—Wall Deslagger — Design and operational features of furnace wall deslaggers discussed in Bulletin 1034. — COPES-VULCAN DIVISION.

535—Unit Steam Boilers — Catalog AD-100 — Gives complete information on oil and gas fired "Self Contained" boilers, 15 to 500 hp, 15 to 250 psi for processing and for heating. Gives features, applications, efficiencies, capacities and dimensions. — CLEAVER-BROOKS CO.

550—Coal Crushers — Catalog 784-C describes single and double roll crushers, swing hammer pulverizers for all sizes of plants. — JEFFREY MANUFACTURING COMPANY.

557—Coal — Current brochure on "Prescription Coals." — A. T. MASSEY COAL CO., INC.

563—Burn Refuse Fuels — Bulletin 510 describes and illustrates spreader stokers for utilizing many refuse and by-product waste materials as fuel to produce steam for process, power or heating use. — DETROIT STOKER COMPANY.

574—Packaged Generator — Bulletin 582 describes Vapomatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psg. Gives operation features and specification data. Available with gas, oil, and combination gas/oil fuel systems. — TEXSTEAM CORP.

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POWER TRANSMISSION
MATERIAL HANDLING**

606—Retaining Ring Kits — 400 Truarc cadmium plated rings — 84 sizes in one economy kit. Sizes from ¼ to 2½ in. in three most used

WHAT 7 THINGS HAPPENED RECENTLY AT FRICK COMPANY* IN WAYNESBORO, PENNA. ?

7 important things for  and you:

1. First of all, on a foundation of our 107 years' experience, our new management has established a growth policy that stresses new product development, quality control, and expansion of field services.
2. New branch offices are being opened and the sales-engineering staffs of existing branches as well as of the home office are being increased.
3. A compressor of new design is being developed. This, like our current dependable line, will handle a variety of refrigerants such as Freon, ammonia, propane, butane and carbon dioxide.
4. A new circulating system using refrigerated sea water has been introduced to commercial fishing fleets, at a saving to boat owners.
5. Completely insulated Shell-Ice makers have been "packaged" for convenient field installation.
6. Service to the growing poultry industry has been highlighted by our new counter-flow-continuous poultry chiller, which uses refrigerated water instead of ice.
7. As part of the growth policy, we are increasing the number of Frick distributors. Some of our distributors have been with us 50 years.

All of which indicates one thing: Frick is "on the move!" If you're passing through Waynesboro this summer, stop in and see for yourself; you'll be able to enjoy our remodeled and air conditioned offices.

FRICK COMPANY

Waynesboro, Penna.

*Pioneers in dependability since 1853: air conditioning, refrigerating, ice making and quick freezing equipment, power farming machinery and portable sawmills.

series of internal, external and universal crescent ring designs — \$34.50 per kit. — DIXIE BEARINGS, INC.

614—Vertical Transportation — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumb-waiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

615—Dial Scales — Catalog gives specifications on dozens of standard and special types for industry. Accessories for printed weight records, remote weight indications, etc. — THE HOWE SCALE CO.

618—Casters & Wheels — Featuring "Lockweld" steel casters without a king-pin, Cat. C-57 describes full line of industrial wheels manufactured and distributed from Rome, Ga. plant. — THE FAIRBANKS CO.

635—Bearings & Bars — Pocket size edition 158 gives complete list of cast bronze and sintered bronze bearings and bars. Bearing aluminum bar data included. — THE BUNTING BRASS AND BRONZE COMPANY.

610—Flexible Couplings — All metal couplings described in Catalog 51A have no wearing parts; offer freedom from backlash, torsional

rigidity; free end float; smooth continuous drive; and visual inspection in operation. — THOMAS FLEXIBLE COUPLING CO.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

700—Peak Load Problems? — Keep your air conditioning and refrigeration systems operating at maximum efficiency during coming peak load months. Catalog tells how Anco treatment removes rust and scale and kills slime and algae in your equipment. — ANDERSON CHEMICAL COMPANY.

701—Exhausting Corrosive Fumes — Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

702—Water Conditioning — Bulletin 611C, 20 pages, describes manual and automatic softeners, zeolites and ion exchange resins, mixed-bed and multi-column deionizers, dealkalizers, ion exchange systems, filters and purifiers, and water treating chemicals. — ELGIN SOFTENER CORPORATION.

705—Test Your Tower — Bulletin offers simple, proved method by which you can determine how closely

your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY.

707—Mechanical Dust Collector — Aerodyne dust collector described in Bulletin 171 combines high efficiency collection with very low draft loss and extreme flexibility of installation. — GREEN FUEL ECONOMIZER CO., INC.

713—Electric Precipitators — 26 page Bulletin 104 shows how units meet five engineering requirements — Positive control of gas flow; high, uniform electrode emission; effective continuous cycle rapping; and safe, trouble-free high voltage equipment. Gives 9 time-tested steps to a successful installation. — BUELL ENGINEERING COMPANY, INC.

716—Dust Collection — Whether nuisance elimination or process material recovery, check on Whirlx Dust Collector Units. Engineering data available. — THE FLY ASH ARRESTOR CORP.

718—Zeolite Softeners — 20 page catalog 4520 describes the sodium zeolite softening process in detail. Contains data required for proposals, lists factors important in selection of proper zeolite material and in sizing

LOOK FOR QUALITY

in your hot water generator...

look to FINNIGAN

Finnigan Hot Water Generators are engineered to give you large quantities of hot water for low operating cost. The finest materials, creative skill and quality construction assure efficiency in Finnigan equipment. These generators are fabricated from corrosive-resistant materials and contain copper removable-coil heating elements. Before leaving the plant, each generator must conform to ASME, API, U. S. Government and other specifications. "Fabricated by Finnigan" is your assurance of quality. Finnigan builds hot water generators to your specifications. Call, wire or write today for complete information with no obligation to you.

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of equipment. Single valve controls all cycles of service and regeneration. — COCHRANE CORPORATION.

737—Water Treating Plan—Separate bulletins combine in folder to form "A Complete Water Treating Plan" for boiler feedwater and cooling water treatment. Leaflets cover various aspects of treatment and equipment. — DEADY CHEMICAL COMPANY.

739—Air Engineering — 8 page Bulletin 135 illustrates and describes air engineering apparatus for process industries. Includes after-coolers, air conditioners, liquid coolers, heat exchangers, condensers, refrigeration equipment. — NIAGARA BLOWER CO.

764—Cooling Equipment — Bulletin 80-D describes company's complete line of commercial and industrial equipment — operating principles, design features, etc. — FRICK CO.

771—Water Treatment — 4 page brochure points out company's 8-point water treatment coverage for elimination of scale, sludge, corrosion and impure steam. — IPCO LABORATORIES, INC.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

807—Motor Bearings — Catalog 258 gives complete listing of cast bronze motor bearings for all makes and sizes. — THE BUNTING BRASS AND BRONZE COMPANY.

813—600-Volt Wiring — How Anaconda Densheath 900 offers long life, high heat and moisture resistance, chemical stability and easy installation is described in Bulletin DM-5612. — ANACONDA WIRE & CABLE CORP.

816—High Voltage Protection — 36 page catalog of linemen's protective equipment describes products for utility and industrial electrical fields. — CHARLESTON RUBBER COMPANY.

820—Electrical Maintenance — New contract service (for Southeast only) inspects and tests motors, generators, gearing, control and distribution systems, at a cost less than 1% of value of equipment. — Atlanta Office of WESTINGHOUSE ELECTRIC.

855—Wiring Analyzer — 4 page bulletin describes Model 301 Adequate Wiring Analyzer which quickly, simply and easily tests wiring without confusing calculators or slide rules. — SPRAGUE ELECTRIC COMPANY.

Complete your shop with this modern metallizing installation



WIRE GUN

Sprays any metal that can be drawn into wire form.



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Sprays hard-facing alloys and ceramics in powder form.

Without metallizing no maintenance or "job" shop can offer the same complete service as the shop that uses industry's low-cost "putting-on" tool.

With modern, low-cost metallizing equipment you can spray carbon steels, stainless, babbitts, brass, bronze, nickel, aluminum, tin, zinc, special hard facing alloys including tungsten carbide.

- Save up to 90% of replacement costs on machine repair jobs
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A real opportunity for the smaller shop

Thousands of large, well-known companies and shops have been metallizing users for many years, not only in maintenance work but in production applications on original equipment. Now, with modern low-cost metallizing equipment this high-speed "putting-on" tool is within the reach of even the smallest shop.



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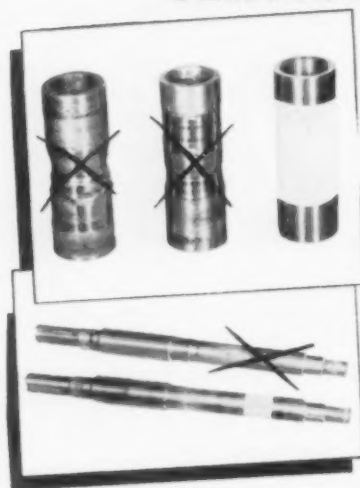
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Eliminate
"CHEWED UP"
SHAFTS
 with **CHEMPRO**
NEW **SPRAYED**
CERAMIC
SERVICE



Chempro's new extremely hard, chemically inert ceramic coatings applied to shafts and shaft sleeves eliminate the costly failure of "chewed up" or "scored" shafts and sleeves. Sprayed ceramic surfaces are highly resistant to abrasion, erosion and fretting corrosion under even the most difficult slurry service. They also give ideal protection against shaft wear under high packing gland pressures.

Pump down-time due to shaft or sleeve failure has been drastically reduced in every installation in which Chempro's sprayed ceramic surfacing has been used.

Write for new Chempro Bulletin CP28 for ordering information.



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NEW Product Briefs

... there is always a **BETTER WAY**

Cartridge Valve

P-1

Development of a new cartridge type butterfly valve designed for quick and easy replacement has been announced by **Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis.

The cartridge unit consists of a



standard butterfly valve in a wedge shaped body which is inserted in the outer body and held in place with the cover. Its flow characteristics are identical to the standard two flange valve.

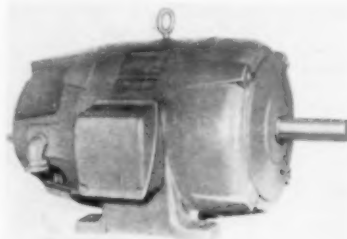
If necessary, the wedge shaped insert can be removed without disturbing the line flanges or the piping. The cover of the valve and the shaft extension accommodate standard manual, diaphragm, motor or cylinder operators.

Wound Rotor Motors

P-2

New wound rotor induction motors designed primarily for adjustable or constant speed drives that require special starting characteristics are available from **Westinghouse Electric Corporation**, Pittsburgh 30, Pa. The new motors cover all standard ratings in frame sizes 254 through 326, which represents motors from 2 to 30 hp up to 1800 rpm.

These motors find a wide range of



use in severe reversing, plugging service and for frequent starting and stopping in such applications as cranes, hoists and bending rolls.

In superseding the types CWP and CIP wound rotor motors, the new line incorporates a Class B insulation system which offers greater thermal stability, outstanding moisture resistance and inertness to chemicals and dirt.

Dust Collector

P-3

A compact, low-cost industrial dust collector suitable for use in any light dust-producing operation is being produced by **Torit Manufacturing Company**, St. Paul, Minn.

The new model stands only 21 1/2" high and occupies a space 12" x 14".



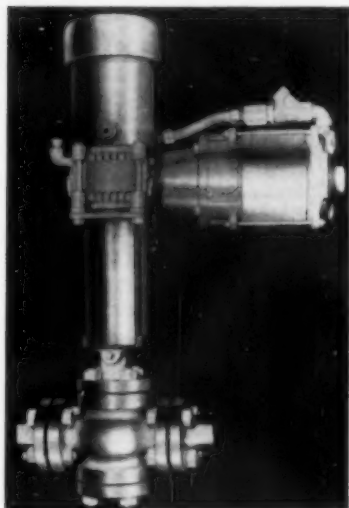
Because of its small size, it can be conveniently located on or under work benches. It is particularly suited to dust control in electronic and other precision production.

The dust-collecting medium is a

highly efficient, fire-resistant, throw-away glass filter. Performance ratings under standard test conditions are: 200 cfm; velocity, 4100; static pressure, 1.7" w.g.; inlet, 3".

Electronic Control

P-4 An electronic process control valve operator for the chemical industry has been introduced by the Electronics Division of **Industrial Process Engineers, Inc.**, Newark, N. J. The



operator employs neither hydraulic nor pneumatic elements and motor starting. Stopping and reversing control are completely electronic operations. There are no mechanical switches or relays.

Frequency response and transfer characteristics are equal to those of pneumatic operators as are the torque and thrust. The operator is capable of stroking speeds up to 3 sec/inch.

Stroke lengths and speeds are available to meet all valve sizes and process requirements and the new operator is adaptable to plug, butterfly or standard gate valves in addition to conventional control valves. It uses standard a-c supply voltages.

Vibrating Feeder

P-5 **Link-Belt Co.**, Chicago 1, Ill., has announced the addition of 49 new sizes, in two motor capacities, to its line of motorized counterweight vibrating feeders now offered in more than 60 sizes with capacities up to 1,700 tons per hour.

These machines are compact, low headroom devices for feeding a wide

DISSOLVE YOUR SCALE PROBLEMS!



ON-THE-SPOT SERVICE NOW!

Eliminate the danger of insurance suspension or up-grading because of ineffective removal and control of scale, rust, corrosion and sludge in your steam generator, heat exchange equipment, condensers, steam and water lines. **IpcO Laboratories Emergency Maintenance Tank Truck** cleans equipment surfaces on the spot, with a minimum of downtime. Pioneers in water treatment throughout the Southeast, **IpcO Laboratories** guarantees to clean your equipment and keep it clean.

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New! A rubberized, liquefied, asphalt sealing compound of unexcelled quality. "Black Mask" covers surfaces with a thick, durable "rubber raincoat" that defies the elements. Silk-like strands of flexible, durable NATURAL RUBBER, interwoven with specially refined and oxidized HIGH MELT POINT ASPHALT, aids materially in retarding condensation on all treated structures. Ideal for Roof, Masonry Walls, Foundations.

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Sensational! The superior brilliancy of this product reflects and disperses up to 75% of the sun's actinic rays. Interiors become cool and comfortable during the "long hot summer." High Aluminum pigment content plus the finest grade asphalt insure an extra thick, quality top-coat. Insulates, waterproofs, prevents rust and corrosion as it repels heat. Provides a protective shield for the under-body of asphalt. Apply with brush or spray.

Gardner SILICONE WATERPROOFING

Superior! A full strength Silicone waterproofing for cement buildings. Designed specifically for southern climates.

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Manufacturers of Quality Roofing, Waterproofing & Flooring Compounds for Home & Industry

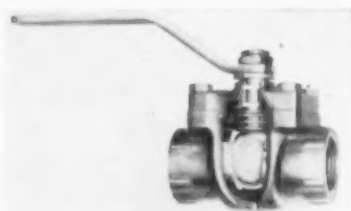
New Products (Contd.)

range of bulk materials — from heavy, sticky ores to light, dry grains — at a uniform rate from bins, hoppers, storage piles or conveyors.

A completely new line of MC twin motor feeders includes 31 sizes with capacities from 275 to 1700 tph, and 18 new single motor feeders have capacities from five to 525 tph. Size ranges now include feeder lengths from four to 14 feet; trough widths from one to six feet and capacities from five to 1700 tph.

Ball Valves

Hills-McCanna Company.
P-6 Chicago 1, Ill., has announced a new line of ball valves designed to reduce initial

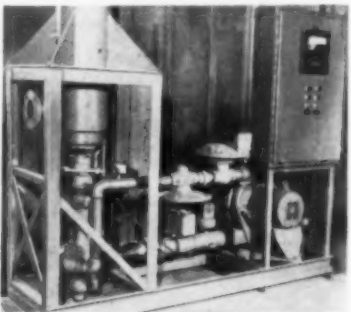


in-place cost, reduce valve maintenance cost, and present other advantages.

Major products in the line are the McCannaseal illustrated here and the McCannaflo ball valves, both of which provide the full flow of a gate valve, the tight shut-off of a globe or needle valve, and the quick quarter turn of the plug valve.

Packaged Heaters

The Brown Fintube Company. Elyria, Ohio, announces the development of pre-packaged assembly for their



complete line of Type 102 fired heaters.

In order to reduce installation time and cost of installing fired heaters in the field, the units are now available pre-packaged from the fac-

tory with all combustion, flame safety and automatic control equipment mounted in position, wired and ready for operation. This permits faster, easier installation, since the user only needs to mount the heater on the combustion section and make one fuel and electrical connection.

Static Control

A complete new line of compact, color-coded static control components has been announced by **Square D Company**, Milwaukee 12, Wisc. Called



Norpak, the new static system is based on the transistor NOR unit. All logic functions, including AND, OR, NOT and MEMORY, can be accomplished with this single NOR unit, making NORPAK extremely easy to apply to conventional circuits.

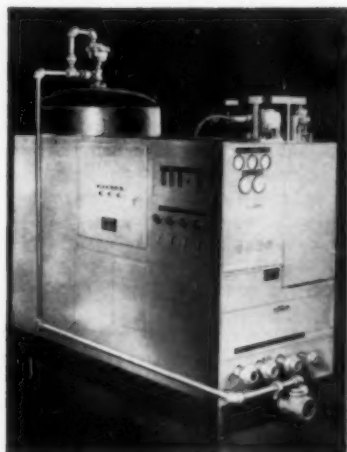
The control is fast, provides switching rates up to 25,000 per second. Logic elements are packaged in space-saving modules and encapsulated for resistance to shock and environmental conditions.

Norpak components can be purchased separately, in 6 or 20 paks, and can be applied without regard to phase sensitivity.

Feedwater Control

The Sparkler - Filtrion Corp., North Chicago, Ill., announces that the design of their automatic side-stream boiler water control systems has been extended to service boilers operating up to 600 psi.

These total control systems models are sized for steam boilers up to 3,000 horsepower. In line with higher pressure operation, the new models feature control of boiler



water silica content. They also provide automatic detection and control of soluble condensate contaminants and positive filtration of insoluble contaminants such as suspended oils, fats and waxes, as well as corrosion products. Dissolved solids concentrations are constantly monitored and positively maintained at the most economical levels by a unique automatic blowdown system. All Filtrion boiler and feedwater control systems are complete, automated all-in-one packaged units.

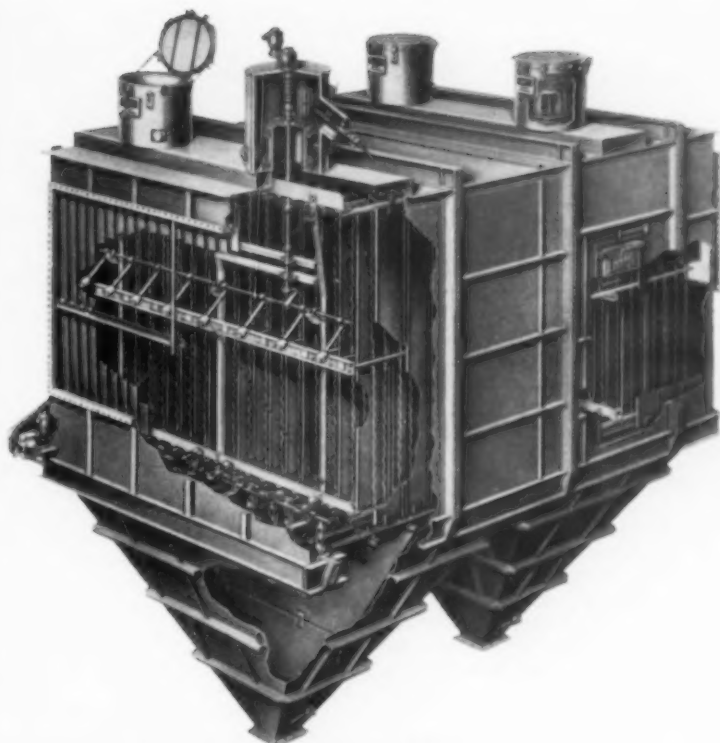
Package Boiler

P-10 Cleaver-Brooks Company, Milwaukee, Wisc., is announcing extensions of its boiler line where gas is the dominant fuel.



The company is showing a new line of low-cost boilers in the 25 to 100 hp range, designed to handle gas or light oil or gas/light oil combinations. It is not designed for heavy oil firing.

The line offers firing and controls tailor-made for the majority of heating and process loads in the 25 through 100 hp range. It includes both high and low pressure boilers. The unit is available for use with hot water or steam.

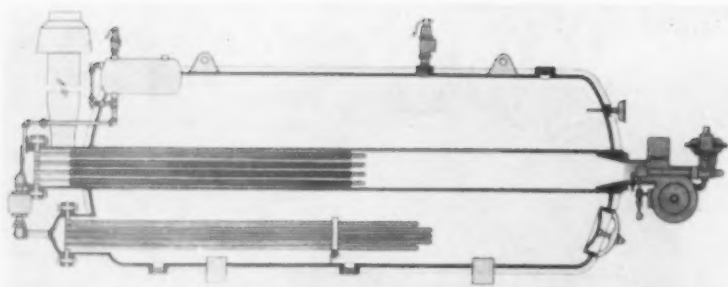


DECADE OF OPERATION PROVES MAINTENANCE OF BUELL'S 'SF' PRECIPITATORS AVERAGE LESS THAN 2%

In 10 years of selling 'SF' electric precipitators, the number of replacement parts ordered from Buell has amounted to only 1.17% of the total sales! Even on emitting electrodes, usually the most vulnerable part of a precipitator, replacement has amounted to less than 1% of the original number installed. What do these extremely low percentages mean? Exceptionally low maintenance costs, for one thing, continuous high-efficiency operation, fewer shutdowns and process interruptions. Buell self-tensioned emitting Spiralectrodes eliminate vibration found in weight-tensioned wires. Buell's low maintenance precipitators will provide you with the most satisfactory operating results. They're backed by 25 years of experience in dust collection, with the practical know-how gained on hundreds of installations. Write for descriptive literature. The Buell Engineering Co., Inc., Dept. 80-D, 123 William St., N. Y. 38, N. Y. Northern Blower Div., 6404 Barborton Ave., Cleveland, Ohio.

EXPERTS AT DELIVERING EXTRA EFFICIENCY IN DUST RECOVERY SYSTEMS

buell



Side view of Patterson-Kelley's new Scalefree indirect gas fired storage water heater illustrates design principles employed in the three basic systems of the automatic packaged unit — the gas-burning unit, forced circulation transfer fluid system, and the service water system.

Gas Fired Storage Water Heater

P-11 A new completely self-contained gas fired storage water heater which eliminates scaling — a condition which particularly plagues "hard water" sections of the country—was announced recently by the **Patterson-Kelley Co., Inc.**

Similar in construction to conventional storage water heaters, the new packaged unit consists of three spe-

cially-developed, closely integrated systems: (1) a unique L-shaped gas burner assembly which promotes high turbulence and excellent combustion in mixing and firing the air-gas mixture; (2) a newly designed fluid-to-fluid intermediate heat transfer system to channel or "localize" combustion for highly efficient heat transfer; and (3) a shell or storage section for heating, storing, and precise temperature control of service water.

Design of the fluid-to-fluid heat

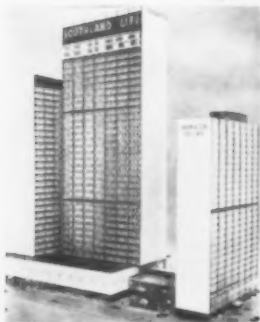
exchange system — which transfers heat from combustion via an intermediate fluid to service water — eliminates scaling, a condition encountered (especially in hard-water sections of the country) when minerals in water dissolve at high temperatures and form deposits on heating surfaces. This happens particularly where heaters with direct flame-to-service water exchangers are used.

In this new scale-free heater, precipitation and deposits of most scale-forming concentrations will not occur since the intermediate heat transfer system employs a prime fluid, usually water, to exchange heat from combustion gases to service water. Also, this prime transfer fluid is constantly recirculated at controlled velocity and temperature within a totally-enclosed loop. New oxygen or other elements cannot contaminate the recirculating prime water, and the enclosed system permits better control of heat transfer and temperature. All water heating surfaces are constructed of copper.

Storage sections — tanks which store the service water until use — are available in 29 different sizes, ranging in capacity from 250 gallons to 4,000 gallons. Recovery range — the capability of the heater to replenish hot water during peak demands — varies from 375 gallons per hour to 2125 gph.

Completely packaged with all necessary operating accessories, the new indirect gas fired water heater is also equipped with electronic controls and safety devices such as an electronic monitor which senses flame failure and automatically shuts down the unit. All electrical components are operated on regular 110-volt a-c house current.

SURE PROTECTION against WATER HAMMER



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At the dramatic new Southland Center in Dallas, 57 Williams-Hager Silent Check Valves protect the plumbing, heating and air conditioning systems from surge pressures and resulting water hammer. Write for Bulletin: No. 654 on the Valves, No. 851 on Cause, Effect and Control of Water Hammer.



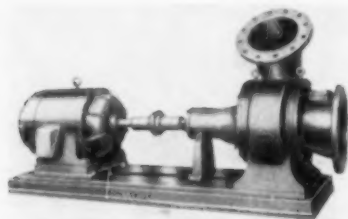
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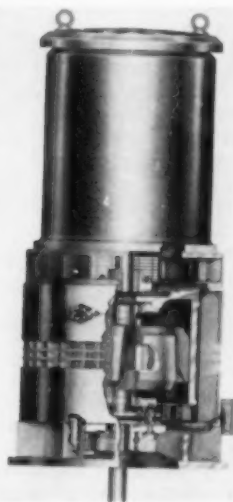


Solids Handling Pumps

P-12 Designed to meet severe operating conditions in the process and allied industries, **Goulds Pumps, Inc.**, Seneca Falls, N. Y., announces a broad line of heavy-duty process pumps. With a capacity range up to 9500 gpm and for heads up to 220 ft, the pumps

are especially adapted for handling fluids with fibrous, granular or other type solids in suspension whether abrasive or non-abrasive; thick liquids of all types such as paper stock, starches, slimes, slurries; under operating conditions where temperatures up to 350 F and working pressures up to 400 lb are encountered.

Pumps are of the end suction, vertically split type, featuring back pullout assembly which gives ready accessibility to all rotating parts without disturbing pipe connections. All pumps have 45 degree self-venting discharge connections as standard. Top horizontal or vertical up discharge can be furnished on special order. Non-clogging, solids handling impellers with back ejector vanes, external adjustment of clearance between impeller and renewable side plates, split glands suitable for quenching and cooling chambers on bearing housings are other features that make these pumps suited for heavy duty service with a minimum of maintenance.



Magnetic Drive

P-13 Electric Machinery Mfg. Company, Minneapolis, Minnesota, is marketing a new line of vertical magnetic drives, designed particularly for pump drive applications.

Manufactured in five sizes, the vertical "Ampli-Speed" can provide variable pumping speeds over a range from 0-1740 rpm. With variable speed pumping through the drive, pump speeds can be exactly matched to flow demands. A variety of sensing controls can be used to make pump operation completely automatic. Also, the units have a

built-in speed control circuit which holds a pre-set drive speed to within $\pm 2\%$.

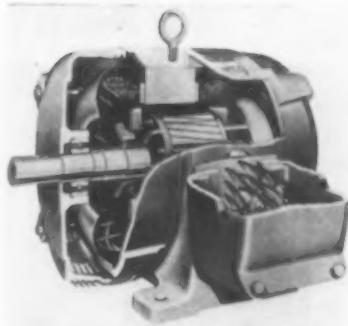
The drive is air cooled. Technically, it is called an eddy current slip device, utilizing two rotating members which "slip" with respect to one another. The drive control is all transistorized and is mounted in its own small cubicle.

Squirrel Cage Motors

P-14 A new line of squirrel cage motors from 3 to 75 hp is now available from the Westinghouse Electric Corporation, Pittsburgh 30, Pa. These motors are designed for outdoor oil field pumping service.

Low magnetizing current assures high power factor even at overvoltage. High starting torque provides positive breakaway even on low voltage under the most severe conditions of sticky loads and icing.

Both the stator and rotor are designed to handle short time overloads. The temperature rating is 10 C below the maximum values of industry accepted standards. Full bar construction is used in the rotor to



assure maximum rotor thermal capacity.

High-slip, high-inertia design is employed to minimize the current peaks caused by cyclic loading, thereby reducing power peaks.

Other features of the new motors include baffling in both brackets for protection against rain and sleet; cast iron frame, and brackets and gasketed conduit box for corrosion resistance; silicone fortified thermosetting insulating varnish for protection against moisture, crude oil and dirt; fully protected bearing construction to keep out dirt and moisture; and antirod screens on all ventilation openings.

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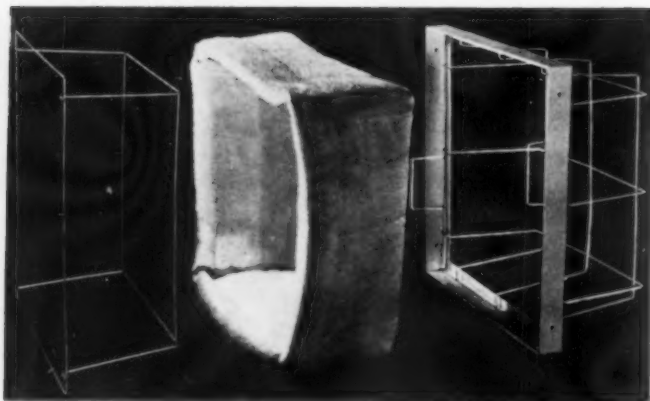
DETROIT

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General Offices: Massey Building, Richmond, Virginia

New Product Briefs (Continued)



Cubic Air Filter

P-15 Substantial savings in filter costs are possible with the new "cube" replacement air filter introduced by **Union Carbide Development Company**, New York, N. Y. The filters are designed for use in commercial and industrial air conditioning and heating, dust entrapment, and process air systems.

Shaped like an open box, the

ULOK filter is made up of three components: the disposable high loft, 2-inch thick, Dynel filter medium; a "basket," or retainer, into which the medium fits; and a rust-proof retainer wire that fits inside the medium to hold it rigid.

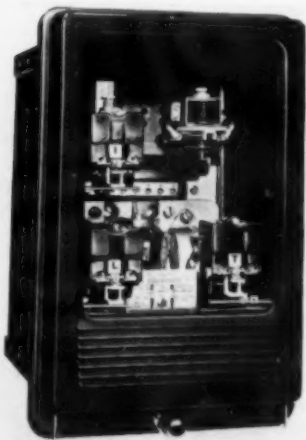
In operation, the air stream carries the dirt into the cube to the front surface of the downstream face of the filter. As dirt builds up on the downstream face, air flow is shunted to the sides of the cube.

The Dynel filter medium, being a

synthetic fiber, is unaffected by moisture. Increased capacity for dust entrapment is also attributed to the batt, which is sewn on four sides to produce the cubic configuration.

Motor Protection Relay

P-16 A new relay (type COM-5) for complete motor protection from very light to heavy overloads is now available from the **Westinghouse Electric Corporation**, Pittsburgh, Pa.

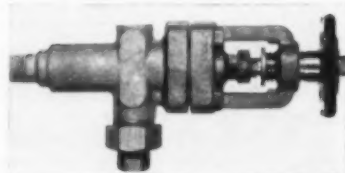


From minimum pickup to 175 per cent of tap value setting, an alarm is sounded and an operator is allowed five to ten minutes to remove the trouble. With medium overloads, the relay gives normal time delay tripping protection. It provides for instantaneous tripping on heavy fault current.

In the past, a number of independent relay packages were required for complete motor protection.

Angle Valve

P-17 A new angle valve which doubles for both liquid level gaging and instrument piping and general use is announced by **Jerguson Gage & Valve Company**, Burlington, Mass.

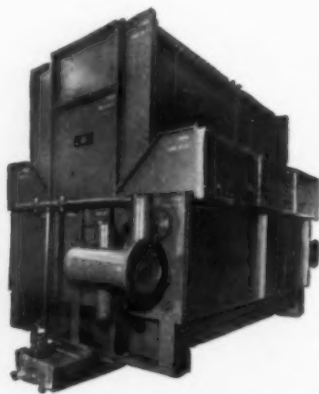


The valve combines features which prevent freezing and eliminate problems of wear from galling in one valve unit built with a minimum of parts. It serves as a basic liquid level

ECONOMICAL COOLING OF GASES AND COMPRESSED AIR

Cooling gases or cooling and removing moisture from compressed air, the **Niagara Aero After Cooler** offers the most economical and trustworthy method. Cooling by evaporation in a closed system, it brings the gas or compressed air to a point below the ambient temperature, effectively preventing further condensation of moisture in the air lines. It is a self-contained system, independent of any large cooling water supply, solving the problems of water supply and disposal.

Cooling-water savings and power-cost savings in operation return your



equipment costs in less than two years. New sectional design reduces the first cost, saves you much money in freight, installation labor and upkeep. **Niagara Aero After Cooler** systems have proven most successful in large plant power and process installations and in air and gas liquefaction applications.

Write for Descriptive Bulletin 130.

NIAGARA BLOWER COMPANY

Dept. SP-4, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

el gage valve; with the addition of a special pipe plug with integral bleed fitting it becomes an instrument valve which eliminates multiple connections in instrument and general use.

Condensate Flow Regulator

P-18 A new condensate flow regulator is being offered by **Stickle Steam Specialties Co.**, 2215 Valley Ave., Indianapolis 18, Ind.



The regulator is essentially an adjustable needle valve encased in a sight glass. It is designed to replace steam traps for drainage of heating and processing units operating continually at pressures up to 60 psi.

The orifice works without moving parts. Thus, it provides continuous circulation of condensate, and is virtually maintenance-free. Condensate is drained immediately so that each steam-operated unit performs at peak efficiency. Flow of condensate can be minutely regulated by a hand key, and once the proper adjustment is made, a locked shield prevents unauthorized change in the setting.

pH Meter

P-19 A compact new line-operated pH meter, ideal for fast continuous service over a wide range of field and laboratory applications, is now available from **Hagan Chemicals & Controls, Inc.**, Pittsburgh.

An auxiliary pointer permits convenient checking of standardization without need of buffer solutions between measurements. Unlike simple colorimetric indicators, the meter covers a broad range of pH.

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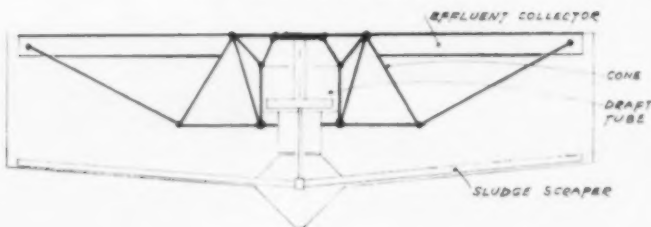
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Reactivator Truss

A new, patented design P-20 that makes possible the economical construction of reactivator solids-contact units in almost unlimited sizes has been announced by Graver Water Conditioning Co., New York. Called Inverta-Truss, the new design provides support for all internal equipment without resorting to the conventional truss bridge. It is constructed almost entirely out of functional members within the unit.

Graver's experience has been that costs rose sharply for construction of reactivators over 75 feet in diameter. Because it makes use of functional members, the Inverta-Truss requires much less steel than a conventional truss with comparable strength. By distributing the stress evenly it eliminates the need for reinforcement at localized points.

Spray Foam Insulation

A new sprayed rigid poly-ether-based urethane foam P-21 has been developed by the Wyandotte Chemicals Corporation, with techniques and equipment for spray application worked out by The DeVilbiss Company, Toledo, Ohio.

The rigid foam is self-adhering and can be sprayed on a vertical surface without sag or runs, using appropriate spray equipment with a DeVilbiss catalyst spray gun.

Tests of the new rigid foam have shown savings in time, labor costs and material of up to 75% in some critical installations. Its insulating and protective qualities would indicate wide application for the exterior coating of tanks, covering of pipes and pipelines and many other industrial installations where insulation or protection against corrosion is a factor.

The sprayed components reach the surface as a liquid and begin instant expansion. The foam will rise and set tack free in less than five minutes. Up to seven inches of foam, or more, can be applied to a vertical surface without sag or drip.

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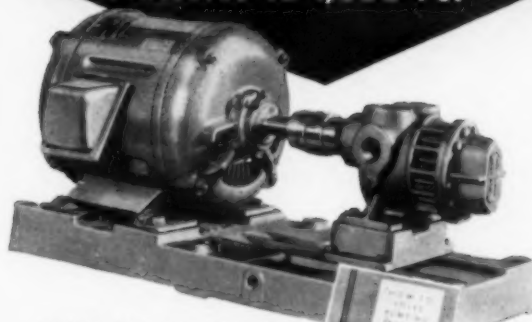
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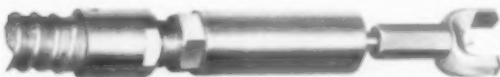
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Are your air preheaters performing at only 50% of efficiency? Or, perhaps, are the tubes so clogged with scale that you have actually by-passed the units?



With Wilson super-power EP air motors driving heavy duty carbide bits, air preheaters can be *cleaned four times faster* than by any previous method. The Wilson way offers speed, efficiency and economy . . . does not injure the tubes. Wilson tube cleaners also are available for use with water power.

Tighten Those Leakers Use WILSON TUBE EXPANDERS

Excellent for re-rolling "leakers" in condensers, heaters, as well as boiler tubes. The operation can be done easily by hand rolling; no special power tool needed.

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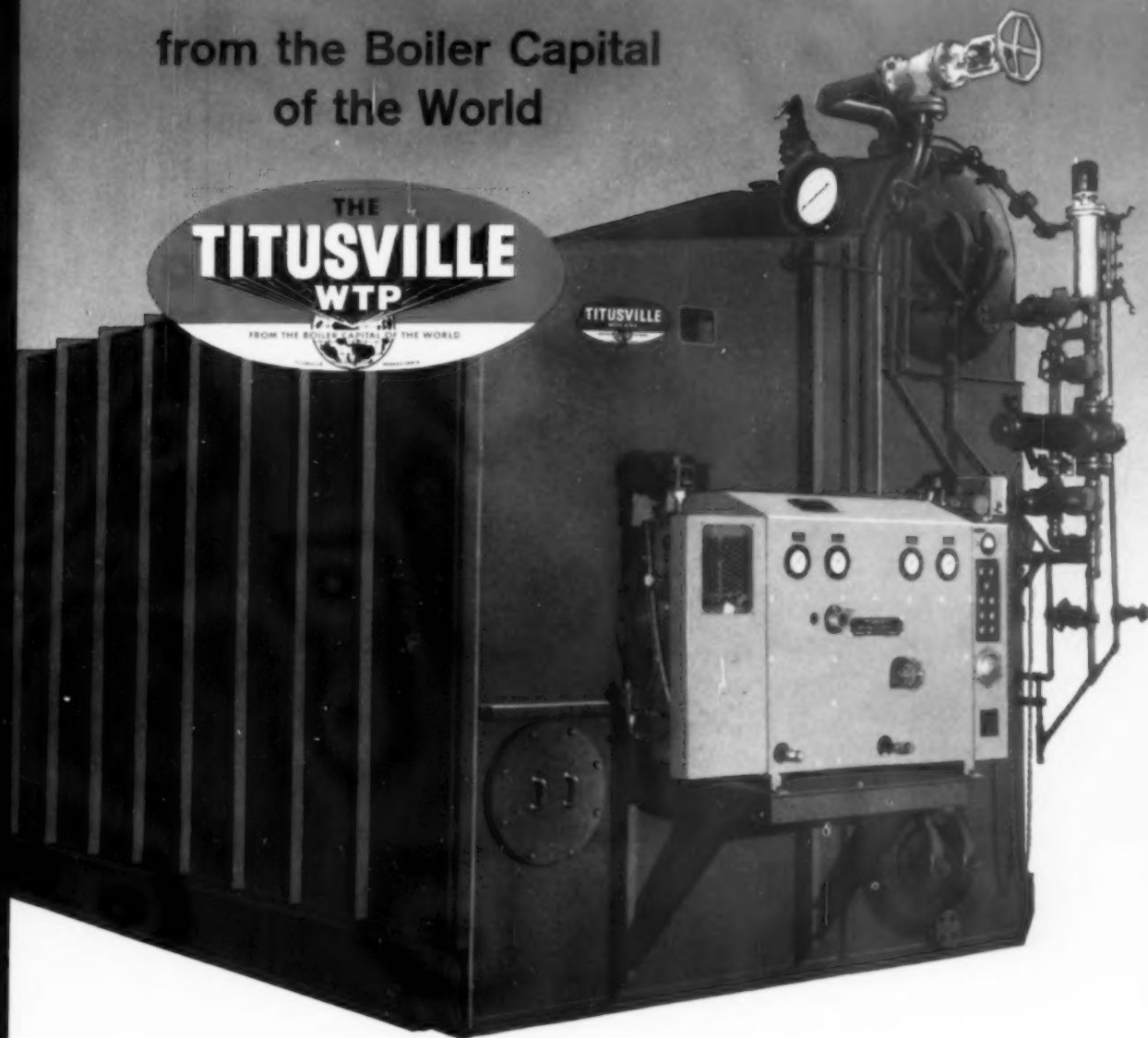
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WTP

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BONUS LIFE means longer life and less refractory maintenance made possible by Titusville's unique WTP design.

65% Black Surface Tube Area coverage on rear wall. Titusville's increased black surface tube area means less refractory maintenance through longer refractory life (less down-time for replacement) and a faster steamer.

BONUS PROTECTION (solves the H_2SO_4 problem). Most water tube steam generators operate intermittently. When dew point is approached at low fire condition, H_2SO_4 can form quickly in *single casing* boilers. Titusville WTP's *double casing* design (with insulation between) reduces temperature differential. *Result:* formation of H_2SO_4 almost entirely eliminated for many times more casing life.

VMA 637A

THE TITUSVILLE IRON WORKS COMPANY
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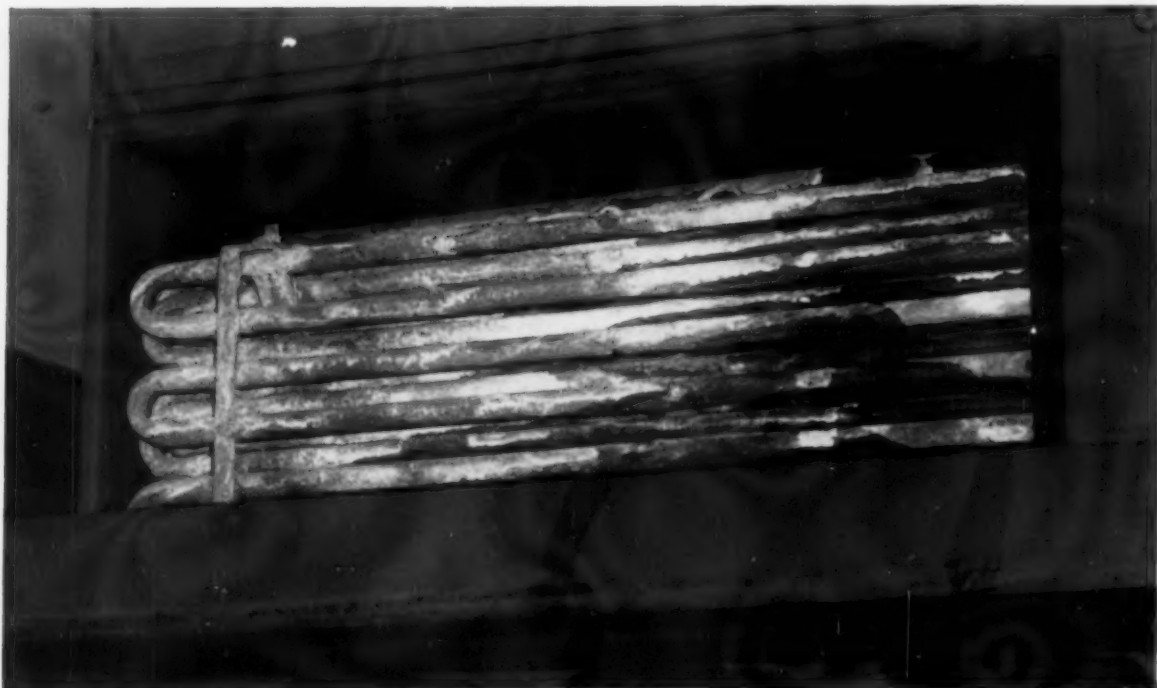
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Prevents SCALE and CORROSION

Corrosion and scale take an expensive toll in maintenance and repairs on cooling water systems and air washers. Scale can ultimately reduce the efficiency to a point of complete breakdown of your system. Of more immediate concern, rust and scale formations act as insulators and reduce heat transfer to an ineffective minimum. Capacity is lowered, operating costs are increased. ANCO Coolex will keep this from happening.

Coolex is a dollars and sense, preventive maintenance product that prevents scale and corrosion in cooling water systems and air washers by neutralizing the effects of Scale-

forming and corrosive elements. The inexpensive, effective formula protects metal surfaces against rust, pitting and scale formation to keep your equipment operating at the efficiency for which it was designed.

Want to know more about this money-saving product? There are competent ANCO service representatives covering the South. Call or write to one of the offices listed below and the ANCO man near you will be glad to come by and give you the full story. A simple preventative maintenance program now with Coolex may well save you hundreds of dollars of replacement money later.

Write today and request an Anderson service engineer to make an analysis and recommendations on your plant's water treatment. There is no cost for this service.

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Anderson Chemical Company, INC.

Macon, Ga., Box 1424 • Phone Sherwood 5-0466

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